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Transition-oriented Futuring: Integrated Design for Decreased Consumption amongst Millennials

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This paper is concerned with the problem of overconsumption and opportunities to create alternative marketplaces that could ease the transition towards less, and different ways of consuming in everyday life. We argue that a more holistic view of the design context, multiple perspectives, and approaches, give more profound insights, explorations, and framings of the problem. Zygo, a future service for teens and young adults, based on the second-hand marketplace, illustrates our approach. Zygo challenges consumer lifestyles and provides a possibility for designing alternative practices around the use of everyday things. Repositioning the second-hand market as a scaffolding that supports and connects the youth in the transient, different and yet complementary phases of their lives, Zygo helps manage aspirations and needs of the youth, while raising awareness around consumption practices. Zygo is both an argument for an integrated design approach, drawing on service, system and interaction design, as well as social practice theory, and a designed proposal with the potential to promote transition design thinking.

integrated design; service futuring; transition design; sustainable consumption

1 Introduction

Conventional design of artifacts for everyday living and marketing strategies for including these in our everyday lives are still engaged in positioning consumer goods for short adoption and disposal cycles, and a long-term consumer engagement with the brand. The basic value proposals are still related to profit. One of the key strategies for securing profit from goods and services is by gaining social status through ownership of exclusive items. It is, however, becoming increasingly obvious that strategy of focusing on the unrealistic vision of the future with continued economic growth and maximization of the profit on the one hand, and social status perceptions based on ownership of goods on the other, have resulted in environment-eroding, unsustainable consumption, and use practices. Societal passage towards a more sustainable everyday future is needed (Irwin, 2015; Irwin, Kossoff, Tonkinwise, & Scupelli, 2015). Design has the potential to chart this passage and make the

transition easier. Design's potential lies in considering systemic changes, and the ability to address the interconnectedness of social, economic and environmental aspects by framing a design space in which the resolution can be found. Understanding of the role of design in these larger, complex transformations and transitions that goes beyond the design of artifacts is currently unfolding and includes holistic, integrated, and meaning-oriented approaches. For example, when considering sustainable living, previously disconnected studies of made environments, nature and its resources, society and culture, and values and drivers of economies are all important and needed when engaging in rephrasing questions around eco-technological, cultural and political tensions through design (White, Gareau, & Rudy, 2017).

In this paper, we tackle the current "throwaway culture" and look at alternative propositions and ways of increasing the use time of durable consumer goods. Recently, this problem gained traction in sustainable design discourse within human-computer interaction (HCI) (Blevis, 2011; Cooper, 2004; Odom, Pierce, Stolterman, & Blevis, 2009; Pierce & Paulos, 2011; Pierce, Strengers, Sengers, & Bødker, 2013; Remy & Huang, 2015) and sustainable design discourse (Hinte, 1997; Lubin & Esty, 2010; Manzini & Vezzoli, 2003; Roy, 2000). In response to the environmental concerns related to the large volume of acquisition and disposal from the first-hand market offering new and unused goods, the second-hand market has been discussed as a viable alternative that might reduce the demand for new goods by reusing and extending the lifespan of durable and functional consumer goods (Gregson & Crewe, 2003; Pierce & Paulos, 2011; Thomas, 2003). However, second-hand marketplaces have existed for quite a long time, yet they continue to remain a niche practice (Pierce & Paulos, 2011). Online and mobile based second-hand marketplace services are more recent. While in theory, they present potentially more sustainable alternatives (Hanks, Odom, Roedl, & Blevis, 2008; Odom et al., 2009; Pierce & Paulos, 2011) to traditional marketplaces, in practice, the experience with such services remains unfulfilling. As a consequence, their uptake is limited, and there is a danger that also these may fail to become a real, mainstream alternative to the first-hand market.

The research presented in this paper is part of a larger research project that involves industrial partners and focuses on the design of services for more sustainable consumption, exploring the potential of second-hand marketplaces to prolong use of consumer goods. We focus specifically on service futuring for millennials, age group of 16-27 years old, because they use technology in everyday life comfortably and naturally (Selwyn, 2013), and have a strong role as influencers for other age groups (Prensky, 2001; Selwyn, 2013). Additionally, the emphasis on a younger demographics supports the possibility of designing for rituals and routines of second-hand use. These rituals and routines can evolve over time and be carried forward later during the adult life through what is referred to in transition design literature as a "sustained and gradual change" (Irwin et al., 2015).

While several strategies for facilitating more sustainable consumption patterns through design have been proposed, design for second-hand marketplaces has remained predominantly focused on seamless discovery and inclusion of second-hand consumer goods as service offerings. In contrast, we primarily focus on practices of acquisition, dispossession, and reacquisition (Pierce & Paulos, 2011). The secondary theoretical premise draws from transition design on changes rooted in, and extrapolated from, the existing system it intends to slowly transform (Irwin et al., 2015). We argue that it is essential to ground *future* service design concepts and approaches in a fuller, integrated understanding of current *practices* related to consumption of consumer goods in general, and second-hand marketplaces in particular. To this end, we use service futuring and visioning methods to discuss and create preferred futures, as exemplified by *Zygo* (Srivastava, 2017). To create Zygo, Research through Design (RtD) (Fallman, 2008), social practice theory and practice-oriented design (Kuijer, 2017; Shove, Pantzar, & Watson, 2012), service design (Manzini & Vezzoli, 2003) and systemic design (Sevaldson, 2011) were used. Thus, Zygo is an example of a designed concept for futuring, as well as an argument in favor of an integrated and holistic design approach towards a

sustained and situated shift to decrease consumption among millennials by creating new, more sustainable everyday practices.

2 Background

In Manzini and Vezzoli's work (Vezzoli & Manzini, 2008), the emphasis is laid on systemic approaches towards sustainable product consumption. They suggest that sustainability should be discussed separately from approaches directed towards optimizing operations and materials. The work of Kuijer, de Jong and van Eijk, (Kuijer, Jong, & Eijk, 2013), brings forward the idea that alternatives to existing everyday practices of consumption can be designed. They point out that, while there is no consensus on establishing and measuring optimal consumption levels, there is a widespread agreement on the fact that current consumption levels are dangerously higher than what can be socially sustained in the very near future. Pierce et al. suggest that *"sustainable interaction design has less to do with redesigning material technologies themselves than with redesigning how we think about, and relate to those technologies already made*" and reframe consumption practices in terms of acquisition, possession, dispossession and reacquisition (Pierce & Paulos, 2011, p. 2392). They also suggest that, while building functional and durable goods is crucial, the problem of premature disposal of perfectly functional durable goods is still there. Thus, a purely functional perspective is not sufficient to tackle the problem. Building on this body of work, we explore design approaches for reconfiguring practices of *reacquisition* based on an understanding of the current everyday practices of *acquisition* and *dispossession* in the consumer marketplace. We start by framing everyday practices.

2.1 Framing everyday practices

Social practice theory conceptualizes human actions and the ways people conduct their everyday lives in terms of their routinized behaviors, or practices (Wakkary, Desjardins, Hauser, & Maestri, 2013). In (Shove et al., 2012), the authors deconstruct practices into three constituent elements: materials, competences and meanings, see Figure 1.

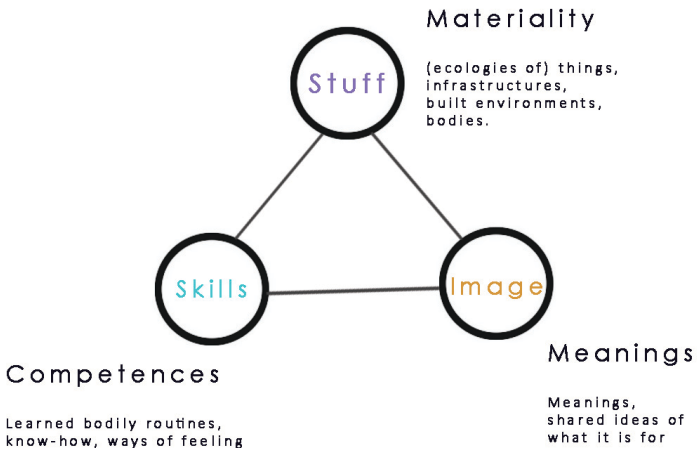

Figure 1 Model of social practice. Based on the model from (Shove et al., 2012)

Shove et al. argue that a specific configuration of these elements, with minor variations at the time of performance by a community, constitutes what is known as a practice. Elaborating further, practices, when performed in a specific context, show some variations in the configuration of the constituting elements and this is referred to as *practice as performance*. However, *practice as entity* is comprised of a variety of similar performances and constitutes a common understanding of a practice within a community. Lastly, the authors differentiate between *proto-practices, practices and ex-practices* as the three stages practices move through. Proto-practices are understood as proposals for future practices and ex-practices refer to practices that are dying or dead. While practice theory acknowledges that practices have their own internal logic and may be hard to

change due to inertia, they also offer the promise of change at a scale far beyond that of the traditional service design based on discovery and inclusion (Ingram, Shove, & Watson, 2007).

Two aspects of framing practices in (Shove et al., 2012) are central in the context of design for second-hand reacquisition and reuse. First, the authors identify *materiality* as a key element, which helps position and determine the role of durable goods, as well as digital artifacts, in this study. Secondly, the framing of '*practice as entity* that is *performed* in endless variations', presents an interesting opportunity to explore the temporal and malleable aspects of reacquisition practices. The value of this approach is in being able to uncover complexities, interdependencies, and dynamism of the *collective and cumulative actions* and make design efforts at that level (Pierce et al., 2013; Wakkary et al., 2013). We argue, in line with Kossoff, Pierce, Kuijer, Wakkary and others (Kossoff, 2015; Kuijer, 2017; Pierce et al., 2013; Wakkary et al., 2013) that social practice theory allows for reframing of reacquisition and reuse as socially constructed practices. This underlines the need for exploratory research and design approaches to reacquisition and reuse.

Service futuring is one way to engage in reflexive conversations about the role of theories, practices, products, services, values and other ingredients needed for transition towards more sustainable consumption. When discussing service futuring in relation to Zygo, we also make use of the rich set of concepts presented in (Ingram et al., 2007) related to general mechanisms the acquisition of goods (social comparison, self-identity, mental stimulation and novelty, matching or the Diderot effect), specialization, appropriation, assembly and normalization, as they relate to practices of acquisition, possession, dispossession and reacquisition.

2.2 Other Influences

Apart from the practice and interaction based approaches, a more systemic view on the use of durable goods has also been suggested (DiSalvo, Sengers, & Brynjarsdóttir, 2010). This research direction led to reexamination of production, use and reuse, as a holistic approach, calling it strategic sustainable design. The discussion around strategic sustainable design hinges on the concept of service economy (Manzini & Vezzoli, 2003) and Product Service Systems (PSS) (Roy, 2000). It is driven by value exchange, where people interact with services and not material goods, hence positioning strategic sustainable design directly within the discipline of service design.

We argue that dealing with practices as a unit of design in sustainable interaction design (SID) should be explored as an important complement to the service oriented perspectives. In (Kuijer, De Jong, & Van Eijk, 2013), the authors argue that systemic approach towards SID implies that practices themselves need to be designed. From a design standpoint, the framing of *proto-practices* as design proposals (Shove et al., 2012), offers a parallel to *prototypes* that are commonly discussed as outcomes of the interaction design process. Further, we argue that systemic solutions need to consider the role of services in the design of practices that address the short usage of consumer goods. This is important because durable commodities do not exist in isolation. They are a part of a larger ecosystem that addresses extended usage scenarios such as support, replacement, refurbishment, all of which have been discussed in strategic service design and PSS literature, e.g., (Manzini & Vezzoli, 2003; Roy, 2000). The interdependence of interaction and service design in the context of artifacts and their ecosystems, has been featured in discussions within design research (Buchanan, 2001; Fallman, 2007; Holmlid, 2009). While Buchanan and Fallman have approached this interdependence through concepts of fourth order of design and services as digital artifacts respectively, Holmild emphasized the value of integration of identified interdependencies of service and interaction design.

3 Zygo: Integrated Framework

Integration of service, interaction design and social practice theory perspectives, we argue, creates a hybrid lens through which we can view the design context for second-hand use and reacquisition of durable goods. In this way, discussion of the materiality of goods is brought into service design, as

well as the ability to consider a larger service ecosystem within interaction design. Further, we argue that dispossession and reacquisition need to be discussed as practices. Working with futuring of a service, calls for an approach that allows for objective descriptions of social practices and behaviors in the present, while cultivating emergent futures through abductive and creative processes, assisting in tracing the path of transition. Generally, design research has been known to be especially effective in future focused and exploratory situations when dealing with complex issues with no perfect solutions. Thus, Research through Design (RtD) (Gaver, 2012) provides an overarching framework to guide our inquiry. In particular, we use the interaction design research triangle (Fallman, 2008) as a tool to drift between design studies, design explorations and design practice. We find the triangle to be a useful tool, regardless of the order of design (symbolic, material, service, or complex systems). Research through Design positions the design practice as a means to engage in informed speculations about the future, based on an empathetic understanding of a situation of a theoretically and topically relevant problematic, resulting in proposals, rather than predictions (Zimmerman, Forlizzi, & Evenson, 2007).

In the context of our research, design practice is framed by our engagement with industrial partners in a larger project that is concerned with more sustainable consumption. Thus, a real-world service organization and its second-hand marketplace has been evaluated at the start of our research. However, our work is guided by our research intent to explore a radically different future and thus, the design practice is focused on design and implementation of presently possible alternatives and visions of future services, as if they existed today, that link consumers, service providers, goods, values, goods, practices and the underlying technologies in a holistic manner.

In design explorations, the focus is on extrapolations from the present to what *can be*, in other words, exploration of future practices and future-oriented design proposals. In the context of second-hand use and over consumption, explorations of technological or alternate service-centric proposals are not based on current market expectations. By way of providing an exemplar from this activity, we explored the role of designed artifacts as enablers of second-hand use. One of the objects designed for this purpose is called *Radius* and was designed as a metaphor for the price and other kinds of tags found on new objects. However, rather than providing expected attributes, Radius exposes a demand or a supply of items in the second-hand market. This object was designed as a behavioral nudge to place consumer goods on the second-hand market. Radius was a conceptual exploration, created free of market, or even technical constraints. Through engagement in reflective making, key discussions emerged, such as how the ecosystem in which Radius is placed affects its form and function, how to ensure decrease in consumption, how it can be shared with household members, etc.

Reflections related to seamless integration of diverse design approaches and practices are related to the design studies area of Fallman's design research triangle (Fallman, 2008) and show how the three design activity areas influenced and informed each other in this research.

3.1 Zygo: Service

Knowing that services focusing on second-hand goods are in theory an opportunity for transition towards more sustainable use of goods, but that in practice the situation is a lot more complicated and problematic (Gregson & Crewe, 2003), we began by understanding current services in the local context. The largest local service for repositioning of second-hand goods is something like Craigslist in the USA. It was established in the early 2000 and has been the biggest and the most influential second-hand market service since. In terms of online services, although not local, eBay has had the most significant presence. However, local mobile services have started growing since 2014, and several have been targeting youth and young adults. All of them are based on traditional service design concepts, based on functionality supporting optimal discovery and placement of goods as service offerings. This, in turn, influences people's perceptions and engagement with such services, which they view as mobile digital classifieds rather than marketplace alternatives, see Figure 2.

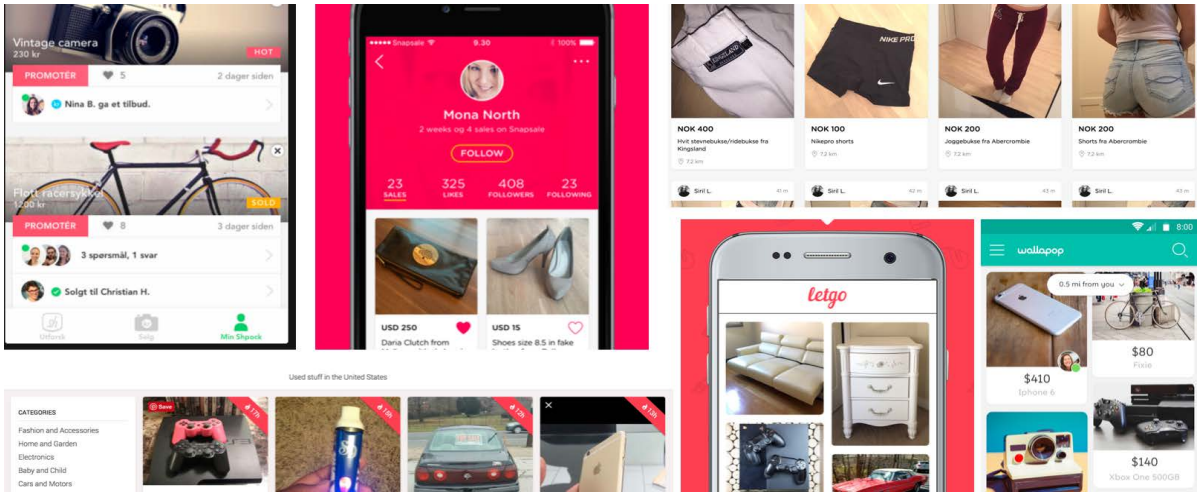

Figure 2 Collage of current online second-hand marketplaces. The images aim to show that products are the exclusive focus in these spaces. No novel or transformational value propositions are visible in these marketplaces.

Therefore, we contend that for the second-hand marketplaces to become a true alternative to the first-hand ones and establish new, de-centralized and localized consumer-consumer relationships, their practices and perceptions need to be challenged, and reframed, both conceptually and through the design of alternate service proposals, situated in a localized context.

Encapsulating the integrated design approach, Zygo is a service proposal based on localized practices of second-hand use and designed around place, people and possessions (see Figure 3), with a focus on the practices and perceptions of the local youth (between 16 to 27 years). It is framed as a scaffold to stages of life in which the youth are deeply invested in independently developing a sense of who they are and who they want to become in the future.

Data on consumption practices, lifestyles and social influences have been collected from sixteen participants, amounting to about 35 hours of recorded material. The main behavioral archetypes (Hartwell & Chen, 2012) that we identified through the analysis of our data were 1) *'nurtured dweller'* – a youth living at home, interested in first-hand purchases and part time income sources, contributing to the second-hand inventory, 2) *'busy frugal nomad'* – those managing shared and temporary living arrangements on a student budget and 3) *'steady independent mover'* - with steady jobs and the ability to replace need based goods with aspirational ones. Zygo has been designed to play a visible role in managing the connections and communication flows between these archetypes, by connecting complementary practices, lifestyle aspirations and needs, see the central part of Figure 3. It incorporates four supporting components: 1) Radius, as an interactive object that helps make decisions on what to sell and buy, 2) diverse print materials that help visualize Zygo as an existing service, 3) a high fidelity mobile prototype of the service and 4) a concept video, utilizing animation and storytelling to articulate possible ways of configuring the elements of consumption practice. Details regarding Zygo and its components, e.g., the functionality of the mobile app prototype, interface concerns related to Radius and other issues that would be addressed within interaction design or service design are outside the scope of this paper. Instead, alternative forms of current and future uses of Zygo and its potential to transform practices towards more sustainable ones, are of central concern. Zygo makes it clear that it aims to support dialogue between different archetypes engaged with the service, help them plan and manage a self-reliant life, assist by sharing relevant information for their transient situation and empower them to become engaged with local, driven and young community it serves.

The following three future narratives feature one of the archetypes each. Narratives are fictive but grounded in the interview data and on Zygo as a designed artifact.

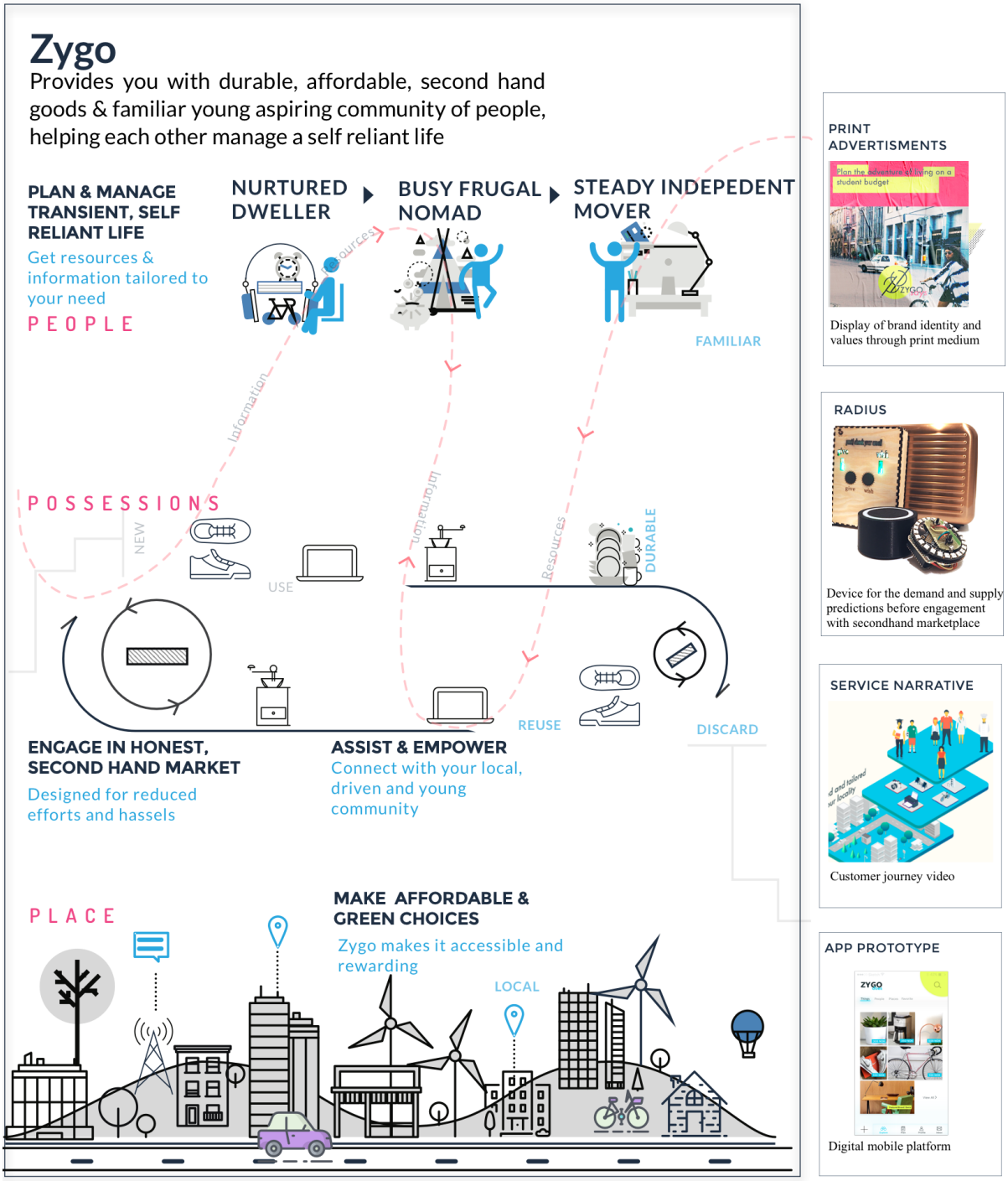

Figure 3 Service visualization, depicting the value landscape. The side images show the supporting elements of the service. These include a mobile app prototype, a video showing the service narrative, a device prototype that shows supply and demand and, finally, printed materials and branding elements

3.2 Zygo: Futuring narratives

3.2.1 Busy Frugal Nomads: Martine and Emma

Martine and Emma are roommates, and long-time friends. Martine is 23 today, but there is no time for a birthday celebration. She and Emma have spent the whole day packing and cleaning their rental apartment. It has been a long and tiring day, yet full of anticipation. The last year of college is over, the dream job is on the horizon. Taking a picture off the wall, Martine glanced at Emma and burst into laughter. Emma was hugging their purple reading chair hard, clearly unhappy about the prospect of parting with it. A freshman girl was to come in 20 minutes and take the chair away.

Emma knew that she cannot take it with her to the city she is moving to. Martine loved the chair too, but her heart was now set on a limited edition Hygge living room piece that she will get for her new place. For the past few months, she has been taking a longer route home, the route that led by Hygge's window display, showcasing what she considered to be the ultimate chair. Martine looked at the picture in her hand. She found herself staring at a photograph showing the party in their gorgeous living room, from two years ago. It evoked lots of memories of their arrival to this place. Martine had just a few books, a bicycle, some lamps and her favourite curtains. Even though the studies and the part time job took most of her energy, she and Emma still managed to create more than a decent interior, on a tight budget. Thanks to Zygo and its University Circle. Martine and Emma, as was traditional when graduating, put a bunch of things from their apartment on Zygo University Circle, the purple chair being one of them. Everyone bought as a freshman and sold when graduating. It was customary to take good care of things in use, in particular, of things for home that were solid and made with love. It was nice and convenient. The incoming students would always look for stuff at the University Circle first, because it was very local, and thus, even without a car, easy to pick things up. They called this "Zygoing" the place.

It was the day when they got the much sought after coffee machine from a newly graduated girl that Martine famously declared that she and Emma were Zygo pros. Time really passed fast. For four years, this place was home and it reflected so much of who Martine was then, and who she wanted to be, too. Snapping back to the present, Martine turned to Emma: "You know, I will miss very much Zygoing my new place with you. Apart from Hygge's chair, I will Zygo everything. Do you really have to go live that far away?" Emma smiled and patted the back of the purple chair "I will never forget how we killed our backs carrying this chair for the entire four blocks, and then up to the third floor. We were just awesome."

The narrative shows Martine and Emma as part of the established social practice around acquiring home stuff from Zygo's University Circle. They bought from graduating students, they sold when they graduated. It was local, green and they felt good about it. This way of engaging with the service even got a name: Zygoing. The girls made an assembly of things from Zygo easily, as they appropriated things in a manner consistent with the vision of frugal, communal student life. They got nearly heirloom, lovable pieces of furniture that it was hard to part from. However, Martine was facing a possibly challenging situation. Buying the Hygge chair, she risked having to get everything much classier that intended, in order to match the superb design of Hygge chair. The matching, or Diderot effect (Ingram et al., 2007), and the social comparison mechanism during the transition from student to professional life were known to trigger overconsumption. Fortunately, Martine was a Zygoing pro, and was aware of this possible trap. The narrative offers opportunities for futuring and discussing practices related to the service, in conjunction with thinking about social practices and consumption mechanisms, both at the theoretical level and at the level of engagement with Zygo over time, tracing the evolving worldview, while transitioning towards the preferred future.

3.2.2 Nurtured Dweller: John

At 17, and from the age of 3, John has an immense passion for electronics. However, he is still in high school and does not have a job yet, so money is an issue and his parents are not very understanding. Earlier this morning, he asked mom if he could do chores to earn some money so that he could buy XyLens II, and her response was: "Did you not get that last month?" "That was just a XyLens, mom, not XyLens II". "Besides", mom said, "you need to see some friends and not live for this stuff only." John has been using Zygo since he discovered the service 2 years ago. He always sold components or other stuff that he did not need any more, in order to be able to support and develop this passion. He would take up new technologies so fast that he would usually be done with them when others just discovered them. Thus, he never had problems selling his stuff. Fortunately, because he often needed extra money to pay for new things. Zygo had the best selection of specialized used items, sometimes even cutting-edge prototypes from the local tech companies that represented rejected research directions. He loved those the best, but they were quite rare. He managed to get only three so far.

Zygo noticed John's special interest, ability and passion for what he does (seeing how he tweaked some standard electronics and was selling way better stuff as second-hands). At this moment, the Zygo stuff was sitting around the table, their coffee pot heated on John's solar heating element, a tweak he sold recently and an employee happened to buy. They were discussing the possibility to use enthusiasts like John and offer him a part time work with their new and still very small research and development team that held totally radical ecological perspective in relation to digital technologies, including following of the principles of green informatics for Zygo's own development. The company held stance that design of their service is never really finished, they were open to exploration and understood that there is no such thing as infinite economic growth, but employees depended on their income and Zygo could not put them in jeopardy. Yes, John should be offered part time work at Zygo. He will no longer need to ask mom for money and mom will not have to worry about his social life.

Like some youth in our interviews, who still lived with their parents, John was interested in engaging with the first-hand market, in his case, a very specialized one. Only very special second-hands were of interest. John consumed a lot of technology, usually new, niche second-hands, and sold a lot. Using the newest technologies stimulated him immensely, and through this experience, he shaped his own identity as a that of a digital wizard and a nerd, i.e. The Creation of Self-identity and Mental Stimulation and Novelty from (Ingram et al., 2007) were the mechanisms that led him to consume. There are several lines of inquiry that open up through this narrative, we outline two. Firstly, how does John exactly use the Zygo app? Does he use any other products in his dealings with the service, e.g., Radius, or alternatives to it? Does he have any practices established in relation to how and when he uses Zygo? If so, how are they performed? Is there room for creating proto-practices? Do other "super users", like John, have different practices? Secondly, how could people like John, powered by skills, knowledge and passion, make Zygo's green aspirations more visible?

3.2.3 Steady Independent Mover: Edward

Edward loved his mornings. His 27 years old body was thriving on morning runs. He just returned from a run, and was tending to his breakfast making routine. He looked through the kitchen window, and found out that he was once more admiring the view. It had a bunch of qualities he appreciated. A scarce find these days. Waiting for the toast, he could not help but notice some Go-wheels in the area. "Well, at least they are bio-powered", he thought, avoiding conflicting emotions of guilt and pride. Guilt emerged every time he thought he had some responsibility for Go-wheels presence everywhere, and pride whenever he acknowledged that they actually do their job well. Go-wheels were driverless carts, used by the vast majority of delivery services these days. Zygo Inc., where Edward now works, is one of them. When businesses were looking for green alternatives, Zygo led by example. Edward appreciated the vision of the company. He accepted the job offer at Zygo because of its cutting edge, dynamic and global work profile. Also, because the company was familiar. He grew up using their services. His four star rating and all the badges he won as a youth prove his long lasting devotion to the service. Now, a part of Zygo, living the life he always wished for, he was working with a team introducing Zygo's hologram inventory displays to local stores. Interacting with holograms is fun, but he still likes the Radius that helped him earn many of the badges. Two days ago, he stepped into his favourite shoe store and found himself scanning a pair of running shoes with Radius. The light on the Radius turned green. It meant that he could get a used pair on Zygo. He pressed the order button. Edward glanced at shoes sitting in the hallway. He ran in them today. He picked them up yesterday from a Go-wheel, just after he returned from work. The shoes came with a story of the previous owner, a local athlete. They were barely broken in, but still more comfy than a new pair.

Edward's story illustrates how the products like Radius, made to fit the purpose of disposal, may promote buying second-hand and increase the loyalty to the brand, even passed student age. This narrative stretches further away in the future than the previous ones. It paints a longer time trajectory of Zygo's existence and use and can be used to speculate and critically reflect on artifacts

in the narrative (holograms, Go-wheel carts, Radius, badges) and lifestyles that they co-create together with human actors.

4 Discussion

Everyday life is, potentially, a powerful transformative space**.** It is also a space that we are so used to that it makes it hard to scrutinize. It is easy, for designers in line with everyone else, to miss larger issues around consumption and consumption related everyday practices (Ingram et al., 2007), especially since traditional interests of designers are focused on new products and services opportunities, and not everyday life with designed objects and practices around use. Thus, drawing contextual boundaries around design spaces for transition towards decreased consumption of new goods by moving the second-hand marketplaces from their niche position mainstream, is not a simple matter. As with all complex, systemic design situations, there is an entanglement of things, people, social practices and environment, and there are no obvious ways to delineate what should be a part of a design context and what not. However, thinking within the framework of four orders of design (Buchanan, 2001), in increasing levels of complexity, is helpful, even though they differ in their strategy, intention, and outcomes. Buchanan (ibid.) suggests that the first order engages in communication, using symbols and graphical design as main vehicles of communication. The second order encompasses the traditional design and focuses on products, material things. The third one advances to interactions, experiences and services, while the fourth considers systems and environments. Each requires distinct skills, methods, and design practices.

In designing Zygo, all four orders of design were important and each is represented by one, or more, of its components. The first order of design enables Zygo to communicate about itself, through printed materials and video. It uses graphic design and visual symbols to communicate information about the service, and animation to show a typical day in lives of Zygo users. What printed and video material communicate is not arbitrary. The design of this material emerged by engaging with our research focus and maintaining a design workbook (Gaver, 2011), that helped create a visual account of '*reflection in practice'* (Schön, 1984) of *influences, rationales and assessment* of the work on Zygo, and allowed us to extract meaningful images, animated narratives and quality information about the service proposition.

Radius is an outcome of the second order of design, it is a designed object made to generate questions around practices related to acquisition, dispossession and reacquisition of consumer goods.

Zygo App is also a designed object, a research prototype and an outcome of the first iteration of service futuring. It belongs to the third order of design as it provides for interactions, experiences, planning and managing actions related to the second-hand market at Zygo. Lastly, Zygo enables creation of practices around the service. Introducing environmental and sustainability concerns, as well as an opportunity to design proto-practices and subsequently social practices, moves the entire project into the fourth order of design. This, as expected, leads to increased complexity and entanglement of issues. The narratives presented in the previous section, aim to highlight aspects of near and far future with Zygo, and draw a picture of how Zygo works and what are the potential issues with respect to the transition towards decreased consumption.

Service futuring for transition needs to establish a set of principles that would enable new, future forms of design and design practices to emerge. Ways of supporting deliberate conversations leading to collective action that enables transition are also needed. Narratives, as the ones presented here, open for such conversations today. They, however, need to be well crafted and rooted in data and data analysis (e.g., finding archetypes of consumption from interview data and identifying challenge points in today's practices), as well as how they support and provide theoretical insights, in order to communicate to others, for example, industrial partners, the relevance of futuring.

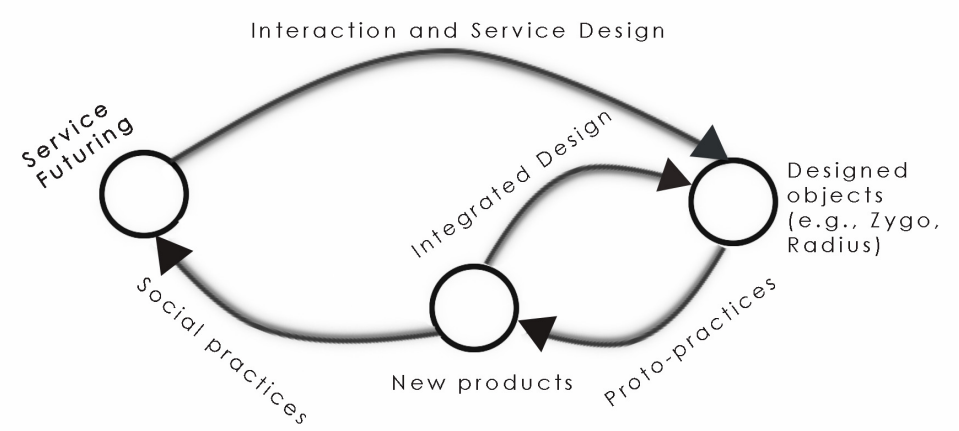

Figure 4 The model of Service Futuring based on Integrated Design approach, including social practices and design at all four orders, for transition towards a more sustainable consumption

We propose an approach to integrated design that draws on interaction and service design, social practice theory and practice-oriented design, see Figure 4. Starting from very concrete and practical concerns of industrial partners, we engaged in design studies and theoretical concerns around the underlying research inquiry and, using research through design, constructed designed objects, Radius and Zygo. Understanding that knowledge emerging from RtD *is provisional, contingent and aspirational* (Gaver, 2012, p. 937), making these objects provide a basis for practice studies and other queries. Knowing that there is a high demand for an unused toaster, would you sell it? Would new practices based on Zygo and Radius emerge? How would proto-practices be used? Such inquires lead to new product opportunities, or to re-design and new explorations with designed research objects, including making of new ones. The new products, however, should have the power to create and support new social practices, such as Zygo's University Circle, introduced in the first narrative. As mention earlier, the service futuring is dynamic and after each successful product and practices related to it, new futuring can take place.

In reference to the transition design framework from (Irwin et al., 2015, p. 7), in this work we have focused on the entanglement between new ways of designing and theories of change, as a way of creating a vision for transition, see Figure 5. Integrated design that includes all four orders of design and practice-oriented design for service futuring is a proposal that was hinted at in (Ingram et al., 2007), and developed here, starting from design of research products, and including then study of proto-practices and how they move towards practice as entity and social practices.

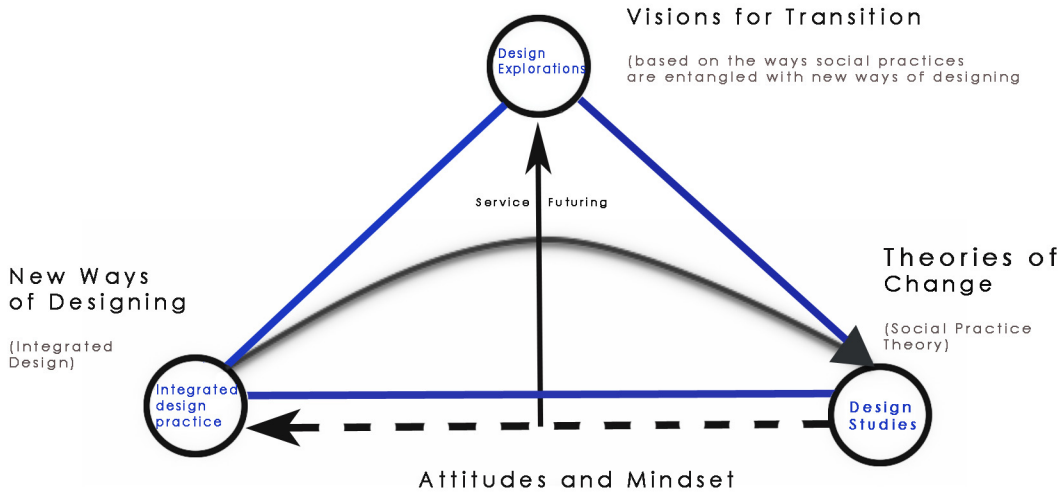

Figure 5 Transition Design Framework to gradually transform consumerist practices towards more sustainable ones

As mentioned in the introduction, the overarching methodology and, specifically, design research

triangle were used throughout the work. The positioning of the triangle as shown in Figure 5, is delineating the dominant areas of RtD engagement (practice, studies and explorations) and elements that promote transition (Integrated design, social practice theory and futuring). This correspondence, just like drifting is in RtD, is fluid and does not prescribe. The reflective account of our engagement with RtD as the basis for our knowledge contributions, moves the focus back to design studies to create a final account of the knowledge generated from the explorations related to Zygo futuring.

In conclusion, we hope that the presented approach demonstrates possibilities of cross-fertilizing theories, diverse design practices within interaction, service and practice-oriented design. In our view, Zygo, and the presented narratives, exemplify a design concept that could be a viable alternative for the real world to transition towards more sustainable consumption practices.

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