

How Design Tools Facilitate Right-sizing Choices for First-time Homebuyers

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Abstract

As society evolves, so does the variety of housing models, which were traditionally distinguished by location, components, and type of dwelling. Currently, lifestyle plays a large part in differentiating housing choices, and the right-sizing movement, which optimizes physical space in conjunction with lifestyle goals, is a new interpretation of a housing model that is gaining interest. Since the first-time home buying process can be overwhelming, a creative decision-making tool may offer direction into choosing the right home that is a suitable fit (or right-sized) for individuals and families. The aim of this study is to: (1) understand the challenges and successes that recent post-occupant homebuyers experienced in their first-time home buying process; (2) comprehend the right-sizing movement and its components; (3) accomplish a comparative analysis of existing creative tools, decision-making tools, and resources to achieve an understanding of the kinds of tools people use to help them make decisions; and (4) create, test and analyze a decision-making toolkit. The key contributions of the research include a home buying preparation aid and a right-sizing teaching tool as well as an organizational approach to designing a decision-making tool. Preliminary results suggest that a decision-making tool could prepare and facilitate the home buying process and create a platform for evaluating one's lifestyle objectives leading to right-sizing embodiment.

Key words: Right-sizing; first-time homebuyers; creative decision-making tools; lifestyle choices

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Chapter 1. Introduction

1.1 Research Framework

As a first-time home seeker, entering the real estate market can seem overwhelming, complex and intimidating. Many people recognize that purchasing a first home is a decision that is not to be entered lightly. How is it possible to reassure, provide confidence, and educate home hunters, while easing their frustrations and offering direction? Could an accessible, creative decision-making tool that collects industry knowledge and includes probing lifestyle questions assist in customizing informed choices to make right-sizing resolutions?

The initial goal of this thesis is to study housing selection for first-time homebuyers to enhance lifestyle choices through home right-sizing, a concept which focuses on optimizing physical space in conjunction with lifestyle goals. Additional objectives include the analysis of existing creative, supportive and decision-making tools to, in turn, create and evaluate a decision-making toolkit that could offer useful and accessible solutions for novice homebuyers. The final intention of this study is to offer an approach for designing supportive decision-making tools.

This interdisciplinary research primarily draws from the fields of design and cognitive science, with support from the fields of interior design and real estate. Cognitive science is already an interdisciplinary field, encompassing the study of mind, embracing philosophy, psychology, artificial intelligence, neuroscience, linguistics, and

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anthropology (Stanford Encyclopedia of Philosophy, 2014). Cognitive science can offer insights on how people process information, make decisions, select creative elements and experience tools, to support their needs and emotions. In addition, the discipline of design can provide insights about creative vehicles to facilitate knowledge transfer, entice individuals to interact with tools, and add value such as a positive association with an idea or model. The fields of cultural and social anthropology, economics, social cognition and human life science add other insights for achieving a well-rounded approach (see Figure 1). This research amalgamates interdisciplinary fields to problem solve, exchange and integrate knowledge towards the achievement of a common goal or objective (Jacobs & Frickel, 2009).

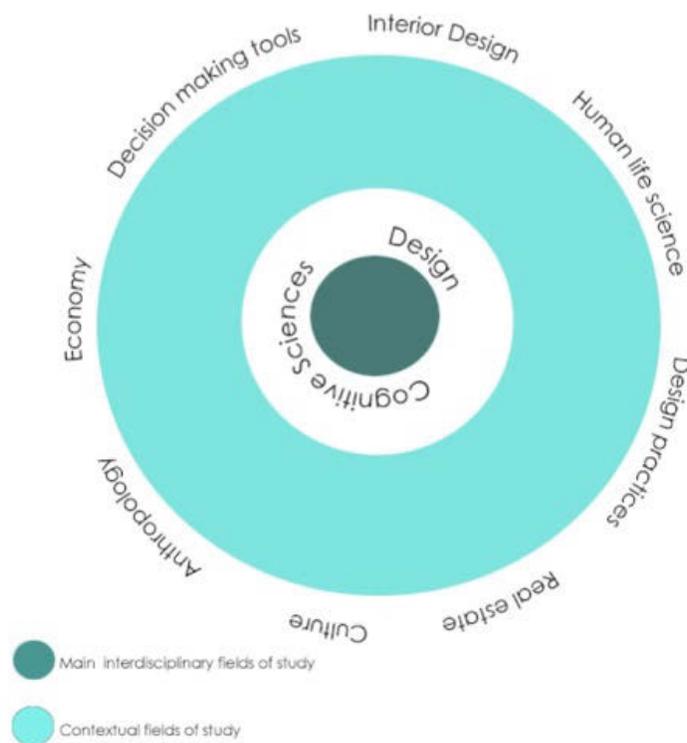


Figure 1. Fields of Study.

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The growing size of homes has fueled the purchasing value of real estate (MacDonald, 2010; CREA, 2016). It also results in an increase in the time, money, energy, and responsibilities home buyers spend on the process. The real estate and interior design literature indicate that home buying affects individual's life course perspective, in terms of the impact of the structural, social, and cultural content of people's lives (Moschis, 2007). Individual's backgrounds, status, lifestyle choices, attachment to place and things and ethnic elements are linked to the choices they make regarding their purchases, including the dwelling type they select (Gabriel, 2013). Housing demands are sensitive to changes in housing prices and size, where dwellings of higher price and size are related to higher expenses required to maintain the dwelling for the homeowner (Barriosa et al, 2013). In response to these challenging trends, alternative options to support house buying and needs are springing up such as right-sizing and different living styles (Suzanka, 2015).

1.2 Hypothesis and Research Methods

This research hopes to explore an engaging and realistic home buying preparation strategy through the design of an innovative decision-making toolkit. The toolkit is intended for people who want to make informed choices in buying a home that reflects intentional lifestyle choices, to live according to their values and beliefs. The decision-making study considers conventional theories with cognitive and behavioral aspects involved in real life decision-making (Raiffa, 1994). The anticipated benefits of the findings are to offer homebuyers preparation tools to assist in the home purchasing process and right-sizing as well as offer an organizational approach to design decision-making tools. It may help educate individuals about the real estate buying process and

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in evaluating their needs and wants to help them discover their unique standards for their housing search. The targeted audience includes first-time home buying individuals and couples who are interested in gaining industry knowledge, entering a reflective phase and creating an intentional living situation in the home buying preparation stage.

The study explored five research methods to support a well-rounded approach to collecting and interpreting mostly qualitative data. The methods ranged from semi-structured interviews to analyzing a variety of decision-making tools, which led to ideation, development and creation of a prototype home preparation toolkit, the 'Prep Deck'. They also included usability testing with first-time home seekers trying the 'Prep Deck'. This exploratory approach enabled the results of one method to inform the direction of the next data collection method. The research methods led to addressing the central question of this study: how can decision-making tools help facilitate first-time homebuyers in right-sizing their home?

1.3 Outcomes

The research investigates how a decision-making tool can contribute to preparing, informing and facilitating the home buying process and assist in helping seekers identify their unique and intentional right-sizing choices. By utilizing the decision-making kit, the 'Prep Deck', homebuyers can integrate varied actions, resources and practices to aid in their home purchasing pursuit. The research also suggests that a home buying decision-making kit may help first-time purchasers to objectively evaluate their immediate and future goals and lifestyle values to make an informed decision. Currently, tools and information pertaining to the home buying process are available in

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various forms and media environments, but this information is scattered. As a result, individuals may miss key information, which could result in frustration, missed opportunities and oversights. The purpose of a home buying preparation toolkit is to gather pertinent information, resources and materials in one place to form a collection of home buying knowledge prompts for home seekers.

1.4 Thesis Structure

This thesis has six chapters. The second chapter reviews a range of literature related to the central question in the areas of real estate, right-sizing, first-time homeowners, decision-making, creative decision-making tools, design media, information design and design elements and principles. The first subject sheds insight on the real estate market, including a brief overview of the realities of the current market and the various interpretations and household models.

The second subject studies the first-time home purchaser in relation to the market, demographics, and lifestyle choices. The third subject explores right-sizing as an alternative housing selection that values space efficiency and lifestyle choices. The fourth subject focuses on the factors and processes that individuals adopt for making decisions. The fifth subject includes the various methods of creating options, selecting criteria and adopting a structure to formulate a creative decision-making tool. The final subject addresses the basic elements and principles of design, the influential principles of information design and the main media that design can adopt to convey ideas.

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The third chapter outlines the five research methods in this study. A qualitative exploratory and sequential approach was used to inform each phase of data collection. It presents the setting in which each method was conducted, the population of targeted participants in the study, the materials and tools used in the data collection and the procedures followed for collecting and analyzing the data. The five research methods included: (1,2) semi-structured interviews, comprising two distinct target groups, (3) comparative analysis of creative and decision-making tools (4) development of a set of guidelines for a toolkit prototype design and the toolkit prototype and (5) usability testing of the toolkit prototype.

The fourth chapter details the insights from the five research methods; it documents the results by presenting qualitative findings. The data from the interviews, creative decision-making tool characteristics, prototype creation, and card-based toolkit usability testing is initially categorized and then followed by a synthesis of the results in relationship to the research questions.

In the fifth chapter, the research question is assessed relative to the previous findings and the literature to present the researchers' insights. It features key findings in relation to the literature, to highlight the role of a card-based design tool as a facilitator of right-sizing choices for first-time home buyers. This chapter also discusses the use of an organizational approach in designing decision-making tools relative to the literature and findings as well as acknowledges the limitations of the study.

The concluding chapter presents the two key contributions, discusses their contribution to the field of design and offers future research propositions.

Chapter 2. Literature review

The sections presented in this literature review represent the various areas that informed and helped formulate the study questions. The information assembled from the various disciplines is reviewed under the principal themes that stem from the main research question: how can creative decision-making tools help facilitate and equip first-time homebuyers in right-sizing their home? The topics are inter-related, since they offer an overview of the realities of home buying in association with design tools as part of a decision-making platform. They collectively address the scope and implications of the real estate market and introduce design instruments as a resource for the decision-making process.

2.1 The Real Estate Market and Homeownership

Residential real estate is a large and volatile component of household wealth (Favilukis et al, 2010). Rising real household income and low interest rates have contributed to higher mortgage debt (Bank of Canada, 2012). As typical new homes are growing in size and in purchasing price, the new generations of home-buying Canadians are struggling to afford them (Drum, 2016). Affordability is conventionally measured by a ratio of housing costs to income. This major life purchase represents people's largest monetary investment and substantially impacts their lives (Thalman, 2003). The household choices that individuals make can either propel them into a desired life or encumber their long-term goals.

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In recent years, the pendulum has started to swing from the McMansion dream to the tiny house movement. This has made room for various interpretations and models of what people want and need in a home. In residential design, professionals are seeing a movement away from the larger scale housing towards a demand for practicality throughout the home (Baker, 2010). The recent economic crisis has more people rethinking the size of their houses. Saving money and cutting expenses is at the forefront of people's considerations, since the focus is more on enjoying life and not living with a "keeping up with the Joneses" mindset (Laundry, 2016). Although economists don't always agree on the numbers, industry experts concur that a growing number of individuals are pursuing more basic needs in their housing choices as opposed to extravagant physical structures (Flisram, 2010). More and more homeowners are making tradeoffs, choosing higher quality over additional space (Suzanka, 1998). Since home occupancy is declining due to the aging population, lower birth rates and non-family households, individuals can look to alternative living environments, including smaller size homes. Many homebuilders are embracing the trend. In an American survey of builders, nine out of ten said they planned to build smaller or lower-priced homes (Perman, 2010).

Most Canadians have a love affair with homeownership and associate the purchase of a home with one of life's aspirations and achievements. "The desire to be a homeowner of one's primary residence is present in multiple societies because homeownership is often interpreted as a symbol of social status and financial wellbeing" (Barriosa & al, 2013).

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According to Statistics Canada's latest National Household Survey (NHS) in 2012, 69% of households in Canada, or 9.2 million, own their dwelling (Statistics Canada, 2012). The growth in housing prices, the volume of home square footage as well as the rate of home ownership have grown considerably, yet home occupancy is on the decline. The decline in birth rates, the aging population and the non-family household are contributing factors which have led to the downturn of household residents within a dwelling (City Planning, 2015).

In 1975, the average Canadian household size was 1,050 square feet. Fast forward to 2010 and new homes being built almost double to an average of 1,950 square feet. Larger scale homes take up more land space, cost more to build, to operate and maintain which creates a greater impact on people's lives. This increase in house size is accompanied by a decrease in the average number of people living in a household. In 1971, it was 3.5; by 2006, that number fell by a full person to 2:5 (Rabidoux, 2012).

Higher house prices and low interest rates have underpinned the expansion in consumer credit (Bank of Canada Review, 2011). In 1980, the average price of a Canadian home was 75,000 dollars, and in 2000, it was 175,000 dollars. In 2005, the cost had escalated to 230,000 dollars, reaching 350,000 dollars in 2010 and expanding to 450,000 dollars in 2015 (MacDonald, 2010; CREA, 2016). The National average of Canadian home prices have been somewhat misshaped by two cities, Toronto and Vancouver. These dual urban sprawls have their own unique characteristics that impact the overall Canadian housing market by distorting the national average prices of homes. This results in the median prices of Canadian homes being dependent on the region in which people are purchasing their home. To understand the purchasing price of any dwelling, there are many influencing factors such as: location, size, age, condition, market position, and mortgage rates; yet all considerations associated with the home

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buying experience are directly related to what individuals can afford. The level of yearly and new listings over the 23-year period, from 1990 to 2013, show a great surge (CMHC, 2014). Overall this is bad news for first-time buyers and will likely “feed concerns about affordability in these metropolitan areas and household indebtedness,” wrote the National Bank’s senior economist, Marc Pinsonneault (McMahon, 2016). These facts don’t change the realities of the imbalance of home prices and household income. Canadians are attributing a large sum of their overall capital to their residence and according to a recent survey by the Bank of Montreal, nearly one in six Canadians would not be able to handle a 500-dollar increase in their monthly payments (BMO Wealth Institute, 2015).

2.2 Right-Sizing

Bigger is not always better, but is tiny suitable for most people? Right-sizing is a new movement in the real estate market. There is little documented research into right-sizing in the real-estate and interior design literature, and one must move to other disciplines, such as business, to find research on the subject. However, right-sizing is a relatable term for the real estate and interior design disciplines since it can direct individuals to look at alternatives in the housing market. The definition is borrowed and altered from the term downsizing, but offers the optimization of living space and evaluation of individual choices and lifestyle in a physical setting. Right-sizing is defined by Patricia-Anne Tom, a real estate and home improvement expert, as making a home fit an individual’s or a family’s lifestyle and needs by maximizing usable space (Tom, 2014). Right-size living liberates people from bigger household demands. The benefit of right-sizing is the creation of a set of unique and personalized living choices. Individuals

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need to assess their basic physical necessities to adhere to lifestyle requirements to fulfill their goals. Lifestyle choices in the contemporary consumer culture are individuality, self-consciousness and indicators of self-expression (Featherstone, 1987). This process requires an evaluation of short and long term lifestyle and needs analysis to reflect and select the right home environment.

Over the last decade, the housing demographic has transformed: a growth in the condominium structures, and various social and economic influences have all led to an increase in smaller-size physical and occupant households. This movement is projected to continue as the average size of households will continue to decline for most lodging types. Changes in demographics of the population contribute to changes in household composition, and the assortment of family and household types, which effect the housing choices that people make (Housing Trend, 2015). As noted by the Canadian Mortgage and Housing Corporation, "non-family households, many of which are households comprising one person, are expected to show the strongest pace of growth" (CMHC, 2014).

As the housing market is constantly evolving, a growing number of home seekers are re-evaluating their housing needs and wants. Suzan Suzanka states that, "not so big doesn't necessarily mean small. It means not as big as you thought you needed, but to suit the way you live" (Suzanka, 2016). Some of the more common contributing factors in the selection of a right-size home include: quality versus quantity, environmental drivers, simplified lifestyle, value based assessment, communal engagement, commuting requirements, reduced stress factors, lifestyle downgrade, additional free time, reduction of possessions, etc. When selecting the right setting,

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aligned with core values, a home can reflect an authentic self and create a sense of well-being, since it is a combination of elements that the homeowners love and enjoy (Suzanka, 2015). Right-sizing is simplifying your surrounding so you can focus on what matters most (Ware, 2007).

2.3 First-time Homebuyers

New home buying Canadians are generally in their late 20s, averaging 29 years old (BMO, 2013). The age of the buyer is statistically significant in the housing market, and is important influence on housing demand as well as on housing choices (Barrios et al., 2013). New generations entering the housing market will cause the housing market to alter its structures. The housing market may transform home owner preferences, tastes and needs, as well as in their abilities to even enter into homeownership. The age of the household seeker seems to play an important role in individuals housing choices and can impact housing decisions by means of its influence on the income cycle of the household as well as through the timing of household formation (Barrios & al, 2013).

New studies in generational housing trends indicate that millennials (or Generation Y), born between 1980 and 1995, comprise the largest segment of the buyer market (National Association of Realtors, 2015). These first-time buyers earned an average household income of \$96,414 and the majority (72.2%) purchased a detached house. Typically, the purchasing price of a first-time home in Canada is valued at \$316,000, however, this differs in major cities such as Vancouver, where the average is \$506,500, Toronto at \$408,300, Calgary at \$363,400 and Montreal, where

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the cost is less than the national average at \$237,900 (Glenworth Canada, 2016). The average first-time home buyer in Canada has \$50,576 to put towards their down payment resulting in approximately 16% of the cost of the home (Glenworth Canada, 2016). Purchasers are able to obtain a home with a minimum of 5% down payment. However, they require mortgage loan insurance when their down payment is less than 20% of the purchase price. In Canada, mortgage loan insurance is available from Canadian Housing and Housing Corporation (CMHC, a Crown corporation) or from private mortgage loan insurers, and is backed by the Government of Canada (CMHC, 2016).

For first-time homebuyers, choosing the right home to align with their lifestyle values is where the complexity arises. As the cost of home to income ratio is disproportionate, purchasing an affordable home to support right-sizing decisions is a crucial element that needs to be well informed. First-time homebuyers fall into one of two categories: (1) young professionals who prefer a turnkey home that needs little or no work, which represents the majority or (2) creative/romantic buyers who want to invest sweat equity and money over time, and put their personal stamp on the property and add value for the future (Estrin, 2016).

2.4 Decision-Making

People must make daily decisions, from uneventful to life altering choices. The Oxford dictionary defines a decision as a conclusion or resolution reached after consideration. Cognitive psychology studies how people make decisions. General decision-making strategies, or mental short cuts, can reduce the cognitive burden

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associated with decision-making (Decision, n.d.; Shah & Oppenheimer, 2008). Different theories explain the influential factors that impact decision-making and the decision-making process itself. Several factors have been linked to strategies that influence decision-making. The factors that influence the choices people make include: past experiences (Juliusson et al., 2005), cognitive biases, thinking patterns based on observations and generalizations (Stanovich & West, 2008), age and individual differences (Bruin et al., 2007), personal importance and possible consequences (Acevedo & Krueger, 2004), and effects of higher levels of commitment.

Identifying the factors that influence the decision-making process is important for understanding how decisions are made. The aspects that impact the process may also affect the results. Problem solving or decision-making strategies are part of a framework to facilitate the assessment of options, of criteria and of suitable resulting decisions (Shah & Oppenheimer, 2008). An essential part of the decision-making process is the structuring and the formulation of the problem (Watzlawick, 1974). Different approaches create different artifacts, but a framework of rationality is key to decision-making. An organized tool allows participants to talk the same language, improve transparency and increase participation within a decision process (Bouyssou et al., 2009).

Decision-making frameworks may vary in design, and may be modified to suit a specific topic. These frameworks generally have common components that include: 1) problem identification, 2) goal identification, 3) formulation of key questions to help users scope problems and options, 4) knowledge acquisition and information gathering, 5) appropriate analytical tools to evaluate actions, options, trade-offs, risks, and uncertainties, and 6) links to specialists that might be associated to or influence those

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decisions. In addition to these common elements, decision frameworks generally provide a platform to respond to new goals, changing circumstances, or new knowledge (National Research Council, 2013). It may be unrealistic to assume that using such frameworks in an optimum outcome but a decision-making aid can help individuals be satisfied with their approach to the problem they've identified by evaluate and asses current knowledge and available options. A framework can offer a critical approach to a multi-criteria topic to help guide suitable choices leading to a potential solution (Bouyssou et al., 2009).

Most individuals want to make the minimum amount of effort when deciding on a matter (Shah & Oppenheimer, 2008). As a result, a framework offers a general guide for individuals to follow, thereby reducing the overall effort they require. A problem-solving framework that accounts for the variety of factors that may influence a decision could be important for helping people make appropriate decisions.

The impact of making a decision is experienced in one of two ways: satisfaction or dissatisfaction (Dietrich, 2010). People may feel regret about how the decision was made, which could be an emotional reaction to their fact driven decision. Disappointment may be influenced by the quantity, diversity, and availability of options during the decision-making process. People feel remorse because they feel they might have made better choices by looking at previously disregarded information, and carefully weighing the pros and cons of each choice (Sagi & Friedland, 2007). Other individuals may experience satisfaction with their decisions and be pleased with the outcome of the decision. People prefer to make their own decisions and are more

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satisfied with their choices if they make knowledgeable decisions and assume responsibility for their choice (Botti & Iyengar, 2004). An attractive decision-making platform and tool has the potential to empower and facilitate the effort of the first-time homebuyers into right-sizing their choices.

2.5 Design as a Communication Tool

Design can facilitate interaction and promote communication given the right approach and tool. A decision-making tool for novice homebuyers can obtain valued information by adopting a research through design approach. Christopher Frayling's 1993 'Research in Art and Design' paper outlines a three-prong approach to research in art and design: 1) research into art and design, 2) research for art and design and 3) research through art and design. Research through design entails grouping research insights by conducting design exercises and continuously reflecting on direct or indirect observations, beliefs and experiences (Reeker et al., 2015). The research approach framed by Binder and Redstrom refines the steps in 'Exemplary Design Research'. According to them, the research through design approach is driven by; 1) question, 2) programme and 3) experiments which act as a framework for carrying out a series of design investigations and interventions. "Question" refers to the research question that guides the study through a combination of programme and experiments. "Programme" defines the area of exploration and the overall goal. Experiment is the concept that embodies the activities (Basballe & Halskov, 2012). "It is 'exemplary' in the sense that it enables critical dissemination through examples of what could be done and how" (Binder & Redstrom, 2006).

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At IDEO, a global design company, research through design is also embraced and focuses on creating positive impact through design, adopting a human-centered design approach. Human-centered design is a six-prong approach to problem solving. It starts with 1) observations, identifying patterns of behaviours 2) ideation, brainstorming ideas based on the observations, 3) rapid prototyping, creating a tangible artifact to test with the end-users, to user feedback, 4) user feedback, gaining knowledge from usability testing, 5) iteration, integrating the acquired input to improve the design, 6) implementing the final solution for users (IDEO, 2011). It begins with people and ends with creative solutions that are created to suit the users' needs (IDEO, N.D.).

Within the research through design process, the grouping of insights leads to the evaluation and selection of a specific design direction by narrowing down important values and criteria. The focus is on selecting one option to develop and refine further, using an appropriate platform to test, in order to provide a better understanding of the research question. A suitable platform leads to the creation of a prototype, which translates the research and ideation into a tangible realization that is central in testing the concept with potential users (Martin & Hanington, 2012). With the research through design approach, the intent is to discover, interpret and develop an approach for the advancement of humans relating to our world (Milton & Rodgers, 2013). It may use a specific case to generate knowledge that advances design approaches.

“Products are not designed for individuals; they are designed for whole *user populations*, intended users doing the target activities within the target market or an internal organization of a business” (Holtzblatt & Beyer, 2016). Even though everyone

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and every situation is different, the analysis of the home buying process can identify aspects of the activity that are similar across all users: structure, strategy, and intents, motives, values, and experiences. An appropriate design responds to the common approach associated with the target activity while allowing for individual variation among people (Holzblatt & Beyer, 2016).

Facilitating the right-sizing decision can be achieved in many ways; one effective and successful method is a problem-solving approach. A problem-solving approach 1) defines the problem by revealing its complexity, which could present the various elements and impacts of homeownership, 2) generates alternatives by exploring options, which, in this case, could help purchasers investigate possibilities and evaluate their life plans, 3) selects alternatives and criteria, which, in this case, could help purchasers make choices that reflect needs and lifestyle, 4) implements solutions and creates results, which, in this case, could assist purchasers in searching for and selecting the right home (MindTools, 2017). This method offers solutions that are tailor-made to suit the needs of the intended user. The objective is to guide individuals towards valuable and accessible means of making informed choices leading to homeownership. A qualified investigation of the existing creative tools, decision-making tools, and resources in design, is a key process in understanding the requirements of that kind of tool. The investigation of existing probing tools serves to inform and guide the key design features for a home buying decision-making tool.

In addition, decision-making processes should be guided by a comprehensive set of performance metrics (Wang et al., 2004). Buying a house requires the analysis of

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several criteria since it is a significant life decision and can influence a person's happiness, well-being and success (Yu, 1985). A simple detailed approach to analyzing other decision-making tools could contribute to developing guidelines for designing a home buying aid. A multi-criteria decision-making methodology considers both qualitative and quantitative factors as well as multi-dimensional attributes and relevant actions. "As qualitative researchers, we seek patterns as somewhat stable indicators of a human's way of living and working to render the world "more comprehensible, predictable and trackable" (Saldana, 2016).

2.6 Design Media, Information Design and Design Elements and Principles

Design Media

"Design is a plan for arranging elements in such a way as best to accomplish a particular purpose" (*Eames*, N.D.). When choosing the media to feature an information design package, designers must consider the various vehicles and systems. Media come in many different formats, including print media (e.g., books, magazines, newspapers, cards, board games, filers) and digital media (e.g., television, movies, videogames, music, cell phones, various kinds of software, and the Internet). Physical media refers to a physical material that is used to transmit information; thus, can be touched and felt, and has physical properties such as weight and color (Agrawal, 2010). Digital media is a blend of technology and digitized content distributed over the internet or a computer network (Digital media, n.d.). Physical and digital media complement each other, yet as our lives are becoming increasingly dominated with digital media, physical media will matter more (Kishor & Ritesh, 2013). In a Hungarian

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market study, which examined trends, media consumption habits and the appreciation of physical and/or digital media, both kinds of media demonstrated advantages and disadvantages. Even though some elements varied according to the different age groups, the consensus revealed that print was more traditional, tactile, prestigious, information credible, eye-friendly, offers aesthetic sensations, and doesn't require additional electronic devices (computer, smart phone or tablet), yet print was costlier, less sustainable, more fragile and less upgradable than the digital media format (Fodor et al., 2013). The main consideration is that the intent and direction of the potential tool will give focus to the media choice. In the same way that every era had its media, print has ruled for ages, and will continue to do so (Kishor & Ritesh, 2013).

Utilizing both media, the different touch-points of the home buying planning journey include any service encounter that a person needs to interact with during their preparation, such as physical buildings, web-sites, physical print-outs, tools and telephones. Physical and digital touch-points are a central element of service design, which is an essential part of the home purchasing process. Design artifacts can also contribute to social change by directing behaviour changes in users (Tromp & Hekkert, 2014). The card-based approach is explored through a home buying preparation toolkit as an added touchpoint to facilitate decision-making. This can help facilitate and direct more progressive behaviour leading to right-sizing social changes.

Physical cards have been popular tools used in the design process, perhaps because they are simple, tangible and easy to manipulate (Wolfel & Merrit, 2013). There are numerous unique card methods used to assist in providing structure to a design and decision-making process. Many method cards have similar features and

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formal qualities, yet their limitations need to be considered. By analyzing the broad categories of card-based methods, a designer can choose the appropriate method that suits the approach he or she is designing the cards purpose. Wolfel and Merrit identified five (5) dimensions which provide a sketch of the card-based method landscape and attributes to consider (Wolfel & Merrit, 2013). The design dimensions include the intended 1) purpose and scope, 2) duration of use and placement in the process, 3) system or methodology used, 4) customization and 5) formal qualities (see Figure 2).

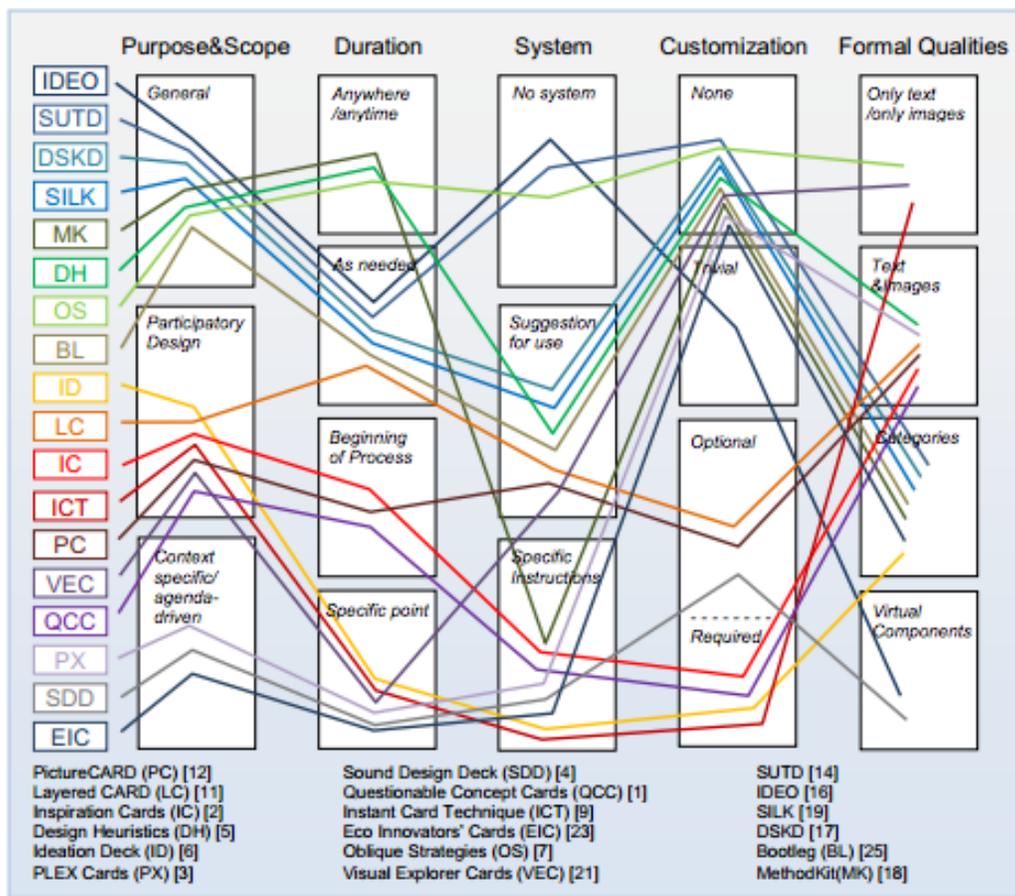


Figure 2. Classification of Method Cards, MethodKit, 2012.

- 1) The purpose and scope of the card-based tool identifies three (3) contexts for analysis: A) general/repository card system provides inspiration, increases lateral

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thinking and initiates problem solving techniques. These types of cards offer little or no direction on their use. B) Participatory card-based tools develop understanding and empathy for the content and engage the users in the process. C) Context specific/agenda driven card decks focus on content to target a user or a subject.

- 2) Duration of use and time of use are elements to consider, in terms of time invested in the system and when the users will apply the card-based tool in a process. It can range from a one-time use or a repetition of use during the practice and when in the process the tool will be employed, in the beginning only or throughout various stages or at a specific point of the investigation. Four main collections are classified: the oblique cards regarded as the anywhere/anytime cards, the method cards used as needed since they provide varied methods, the picture cards used for card creation and specific points cards used in a defined context or time frame, such as a workshop setting.
- 3) Methodology of use evaluates the approach to take in identifying how to direct the interaction with the cards. Within methodology of use, three (3) categories emerge: the “no methodology” suggests no specific instructions, the “basic suggestion of use” can offer simple directives yet, “no specific rules” and the specific instruction cards include defined commands.
- 4) Customization also conveys three (3) main classifications, the no customization which is static and unchanged, the trivial customization is also fixed and unchanged but permits a re-structure and grouping of the cards and the optimal optimization permits the user to create, re-design or add to a card/deck.
- 5) Formal qualities focus on the physical properties of the cards, such as two- sided, paper, shape, size, multiple copies, including the appearance of linking images,

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graphics, text, colour scheme, etc. as well as considerations of whether it will remain as only a physical entity or be linked to the digital world. The simple type only feature text or images and the combined approach joins text and images or illustrations. The choice of graphic elements needs to be a suitable choice for the cards and audience. “Image should be abstract enough to allow an open interpretation yet detailed enough that the user can relate to and interpret it” (Lucero & Arrasvuori, 2010).

A successful example in the design field features the method cards by IDEO, a leading global design company, which prides itself on being expert on the process of how to design articles and systems. The method cards are divided into four categories: Learn, Look, Ask, and Try. The organization makes the topics and issues easy to reference, browse, sort, and share the cards. The cards are mainly utilized as tools for the design process, created to focus on a particular problem (IDEO, 2003).

Within any venture, including home purchasing, touch points are part of the experience. Using tangible cards as a preparation touch point makes the process more visible, less abstract and serves as a communication tool between users and their team of industry professionals. Card-based design tools can be referred to as interactive media for their engaging, collaborative and developmental aspects (Wolfel & Merritt, 2013).

Information Design

The art of presenting data visually relies on key principles to successfully relay information in a way that engages an audience and quickly transfers knowledge. Information design or infographics are important communicative vehicles in providing visual representations to synthesize data, allowing for more effective translation of concepts, and enhancing viewer comprehension and interest in messaging. Edward Tufte reminds readers that “the world is complex, dynamic, multidimensional; the paper is static, flat”. That is why he represents complex data in visual displays of information interconnecting images, words, and numbers (Tufte, 1983). In, *Infographics: The Power of Visual Storytelling* (2012), Lankow, Ritchie, and Crooks state that it is important to identify the primary goal of the messaging in order to present information to a desired market, as well as create a captivating platform to communicate a message. The three main areas of appeal, comprehension, and retention are directions that center on the primary goal of the messaging. The focus is on ensuring that the intention of the design is clear and as intended (see Figure 3), (Lankow et al., 2012, chapter 1).

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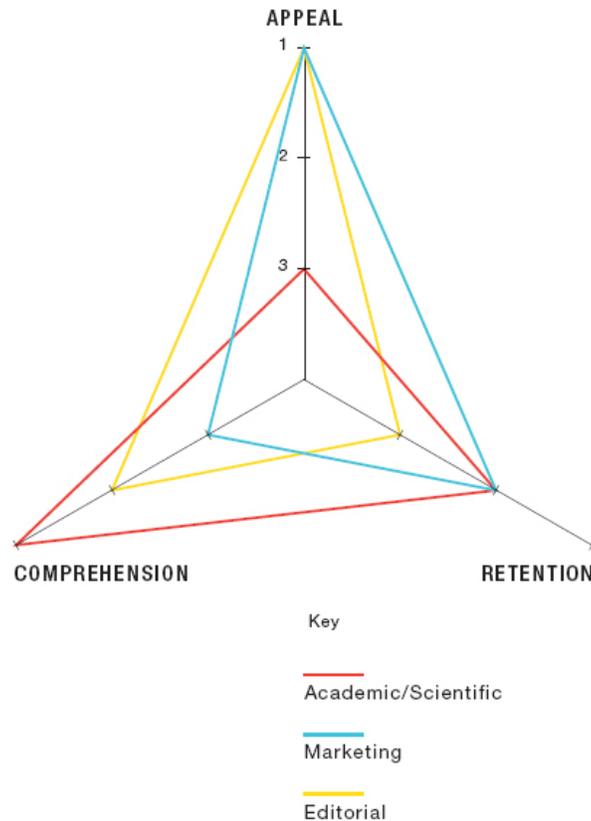


Figure 3. Infographic Priorities by Application, 2012.

In a design-focused culture, and an ever-growing media landscape, it is increasingly important to use great design to attract attention and stand out from the crowd. "No longer is it enough to have the facts; researchers must pay ever more attention to how to present them" (Heeg, 2013). Aesthetically pleasing design is perceived as easier to use, having a higher probability of being used and promote creative thinking and problem solving (Lidwell et al., 2010). Visual appeal is always beneficial for presenting information by way of engaging, attracting and enticing people to delve deeper into the content. Designers can appeal to individuals by linking visual elements to the desired emotional responses of the intended audience. With that

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mindset, “Good design not only garners additional appeal for an item, it can also actually incite an emotional reaction” (Jobs, n.d.). Capturing interest and getting the brain engaged can aid in the understanding of the material, and is a must to attract attention (Lankow et al., 2012, chapter 1).

Infographics are a type of picture that blends data with design, helping concisely communicate messages to an audience (Smiciklas, 2012). Relaying large amounts of information in a small package, infographics focus on communicating information. “Visual communication is text, images and graphics in forms that are consumable by information users” (Craib, David, 2013).

It’s much more than choosing precise wording or statistics; it’s also about the details of placement, color choices, font size, style and images which create the best infographic balance. Information visualization, like most design fields seeks to achieve a balance between the aspects of utility, soundness and attractiveness (Lankow et al. 2012) (see Figure 4).

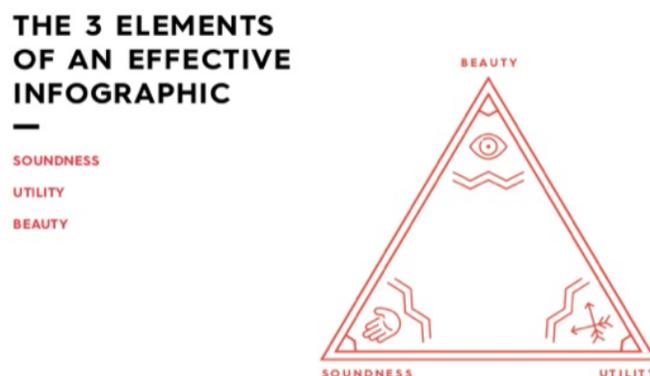


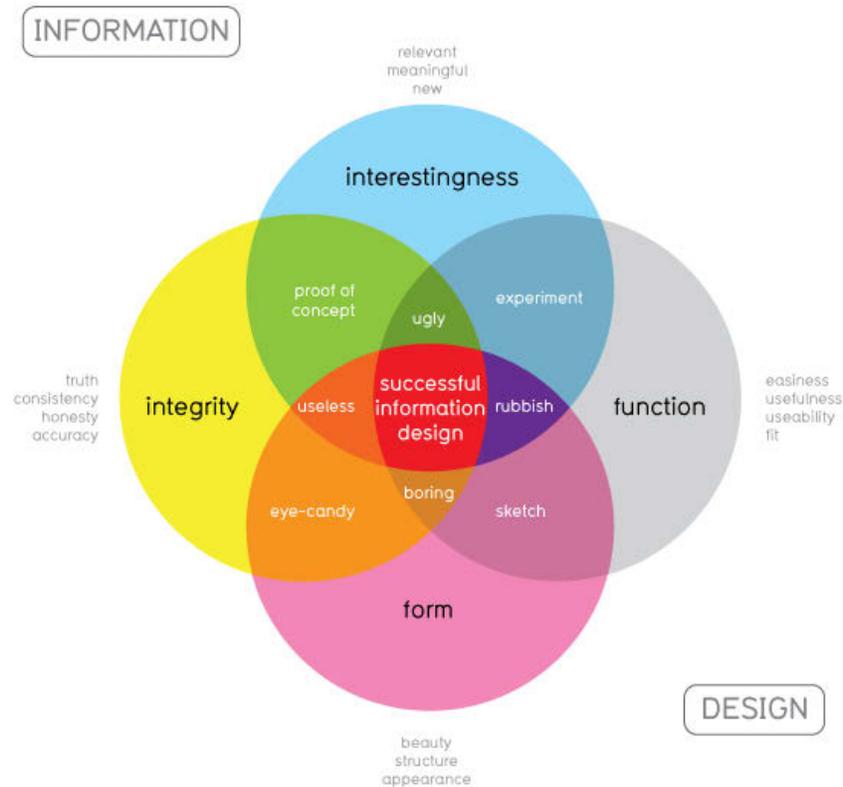
Figure 4. 3 Elements of Effective Infographics, 2012.

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Design is a symbiotic experience, which is dependent on emotion and evolving processes, and characterizes the collective or individual and personal references in a positive or negative way (Kazmierczak, 2003). The fundamental quality of design and graphic representation is the relationship between the selected data and the conceptual unity of the graphics to ensure accessible content, focusing on bridging the gap between form and meaning or comprehension (Kazmierczak, 2003).

In 2012, David McCandless created a simple infographic, depicting the elements that create good information design, which reflects the foundation of the principles as well as many of the leading voices in the field of infographics (see Figure 5). It features four main areas that contribute to good information design: 1) interestingness, which introduces relevant, meaningful or even new information, 2) integrity, which offers truthful, consistent, honest and accurate information, 3) form, which presents beauty, structure and appearance in its composition and 4) function, which hosts easiness, usefulness, usability and fits the objectives (McCandless, 2012).

What Makes Good Information Design?



David McCandless // v1.0 // Nov 09
InformationIsBeautiful.net

Figure 5. Infographic Design by David McCandless, 2012.

Information design also enhances the viewers' comprehension so they can invest further in the subject matter. Infographics provide a fun and engaging platform to boost integrity and exposure. "Infographics are a brilliant approach in the business and design world currently and have become the easy technique for passing on useful information to the audiences/readers" (Siricharoen, 2013).

Elements and Principles

Design is defined as a purpose or planning that exists behind an action, fact, or object (Design, n.d.). By incorporating the basic elements and principles of design one can provide a good foundation. According to architectural and graphic practitioner and writer Francis D.K. Ching, visual characteristics are important design elements to consider, since they relate and interact to form the aesthetic quality of a person's visual perception (Ching, 1987). Ching's visual characteristics include: form, shape, colour, texture, light, proportion, scale, balance, harmony / unity, variety, rhythm, and emphasis.

- Form is created by a point, as the point moves, it traces a line, as a line shifts direction it defines a plane and as the two-dimensional element is elaborated it creates a three-dimensional volume.
- Shape defines a specific configuration of lines and planes that differentiate a form from the back or foreground.
- Colour is within the visual spectrum of light, which is determined by its wavelength properties, from the longest with red passing through orange, yellow, green, blue and concluding with the shortest, violet. By combining red, green and blue, an additive colour mixture is created, which forms white and by mixing cyan, magenta and yellow, a subtractive colour mixture, black is created.
- Texture is the quality of a surface from smooth to rough or depicting the quality of a particular material. Light remains the basic factor that allows visual components to be viewed by forming direct or indirect lighting.

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- Proportion is the size of an element in comparison to others or to the whole in a composition, which relate to scale, the associated size of things.
- Balance is how each element is assembled and how much visual weight it provides in a composition.
- Harmony reflects the unity of elements that share traits in a composition. Variety demonstrates unique aspects within a composition to create interest and artistic tension.
- Rhythm forms repetition thus, creating continuity and movement within a graphic structure.
- Emphasis establishes the relationship between subordinate and dominant characteristics in a scheme, featuring a leading point of interest thus, generating a degree of importance.

In a design, all parts and pieces depend on one another for their visual impact, function and meaning (Ching, 1987).

As demonstrated in Table 1, each visual characteristic has its own embodied components that come together to form a complete visual composition.

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Elements & Principles	Components of the Elements & Principles of Design (Ching)			
Form	<u>Point</u> Static dot (circular shape)	<u>Line</u> One- dimension (length)	<u>Plane</u> Two- dimensional (width & length)	<u>Volume</u> Three-dimensional (Interrelationship of the lines & planes, creating the boundaries of the volume)
Shape	<u>Contour</u> (Perceived line)	<u>Outline</u> (Actual Line)	<u>Boundary of a mass</u> (configuration of lines & planes)	<u>Natural</u> (natural world), <u>non-objective</u> (no reference to a specific object), <u>Geometrical</u> (rectilinear & curvilinear)
Colour	<u>Hue</u> Attribute of colour recognition	<u>Value</u> Degree of lightness and darkness (relating to white & black)	<u>Intensity</u> The purity or saturation of a colour (compared to gray)	<u>Colour schemes</u> Colour group structure based on hue, value & intensity. (monochromatic, analogous, complementary, split-commentary, triadic)
Texture	<u>Physical</u> Tactile, real to the touch	<u>Visual</u> Perceived by the eye	<u>Material</u> Depicts a specific material (ex: wood grains)	<u>Patterns</u> Decorative elements or a motif. (can create a texture if often repeated.
Light	<u>Point</u> Lights specific elements	<u>Line/plane</u> Creates light and dark configurations	<u>Volume</u> Wide spread, general light	

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Proportion	<u>Magnitude</u> The extent of an element	<u>Quantity</u> Amount or number of elements	<u>Degree</u> Measurement of intensity	<u>Harmonic composition</u> Golden section, ratio / Fibonacci series.
Scale	<u>Mechanical</u> Physical size, system of measurement	<u>Visual</u> Perceived size, relative to other elements or environment	<u>Human</u> Size relative to human dimensions	
Balance	<u>Symmetrical</u> Arrangement of identical elements in equilibrium on an axis	<u>Asymmetrical</u> Arrangement of dissimilar elements lacking in equality or balance	<u>Radial</u> Arrangement of elements dependent on a center point	
Harmony & Unity	<u>Shape</u> Sharing similar structure and form	<u>Colour/value</u> Distribution of balanced colours and value	<u>Texture</u> Related textural elements in unison	Material/details Similar detailed characteristics and materials
Variety	<u>Size</u> Diversity in dimension	<u>Shape</u> Mixture of configurations	<u>Colour</u> Utilizing distinctive pigments	<u>Texture</u> Dissimilarity of visual surfaces
Rhythm	<u>Contrasting</u> Dissimilar repeating	<u>Foreground / Background</u>	<u>Horizontal / vertical</u>	<u>Layered</u> Introducing a repetition of forms containing

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	patterns from general arrangement	Layering a repetition in forms, either in front or back of the central arrangement	A dominant directional sequence (left to right or up & down)	multiple overlays in a composition
Emphasis	<u>Size</u> Dominant characteristic in volume	<u>Shape</u> Distinctive form	<u>Colour</u> Bold colour or use of hues	<u>Value</u> Highlighted components

Table 1. Elements and Principles of Design – Francis D.K. Ching.

2.7 Summary

The literature shows that purchasing a home is a multifaceted and involved venture, especially for inexperienced individuals such as first-time homebuyers. In combination with selecting the physical characteristics of a space, individuals must look at lifestyle, financial aspects, and their long-term goals to assess their dwelling choices. With a multitude of options and possible directions, individuals may find it difficult to find their way through it all. This study proposes to learn more about the nature of the real-estate market and the issues that first-time homebuyers face with the objective of minimizing the complexity through the design of a toolkit for their decision-making.

While the literature provides some insight into the demographic of first-time homebuyers, it minimally addresses their needs and wants while searching for a home,

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and it does not shed much light on the tools that are available to first-time homebuyers or what professionals face when working with this population. As a result, the following sub-questions provide direction for some of the data collection methods, focused on first-time homebuyers in Ottawa, that are explained in the next chapter:

- What does this study contribute to our understanding of the real estate market?
- What is significant about and important to the first-time homebuyer?
- What are the decision-making resources and tools accessible for first-time homebuyers?

In addition, the cognitive science literature indicates that utilizing a framework offers a general guideline for individuals to follow as an aid in the decision-making process. The literature on decision-making provides insight into the range of factors that influence any decision-making process: past experiences, cognitive biases, thinking patterns based on observations and generalizations, age and individual differences, personal importance and consequence, and effects of an increase in levels of commitment. As the literature also notes, strategies can reduce the cognitive burden linked with decision-making, and by creating a decision-making tool that could effectively provide a framework or a strategy for making choices it could make the process easier for people. Therefore, it is important to probe more deeply into creative decision-making tools that are available to develop guidelines for the design of a first-time home buyer's preparation kit. This leads to another sub-question for this study:

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- What are the characteristics of existing decision-making tools and how can they offer insightful information for a set of design guidelines for designing a home preparation kit?

Lastly, the literature points out that the design of such a framework for a toolkit depends not only on its content, as discussed above, but also on the design medium, especially its ability to communicate the information, and the elements of that visual communication. The literature indicates that paper media is useful at certain touch points along the path of utilizing a service and that cards are tools for decision-making in the design field. It explains some of the dimensions that should be considered in designing cards in particular, such as the intended purpose and scope, duration of use and placement in the process, system or methodology used, customization required, and formal qualities. The last dimension that is discussed in the literature about visual design elements includes features such as: form, shape, colour, texture, light, proportion, scale, balance, harmony / unity, variety, rhythm, and emphasis. Therefore, the following sub-questions guide the design element of this study and lead to its central question:

- What kind of guidelines would contribute to a useful design for a decision-making card deck?
- How can design facilitate and engage home seekers to utilize a decision-making tool in their home preparation search?

The review of the literature has established that purchasing a home is a complex endeavour that involves many facets, actions and individuals in navigating its processes

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and end results. To understand the processes, this study seeks to understand why individuals want to buy a home and what are they looking for, how first-time buyers approach the venture and whether they use realistic tactics, how they prepare themselves and what resources they trust for information, what are some of the realities of buying a home for the first-time buyers and what would they wish they knew more about to facilitate the process? To gain an understanding of these elements, a five-prong approach was undertaken to ensure a thorough evaluation of the elements of the home buying process and assess the usefulness of a creative design tool to facilitate right-sizing choices. Overall, the literature review revealed areas for further study, which led to the methods described in the next chapter.

Chapter 3. Methodology

This research study is influenced by Creswell's (2014) exploratory sequential qualitative research methods for gathering information. The initial exploratory approach aims to investigate the view of the participants, to learn their qualitative perspectives and identify their main themes, which could offer insights into the issues related to preparing to buy a first home. The data collection builds on analysis of the sequential findings, where each set of findings informs the next step in the study, providing rich and triangulated qualitative results. This approach attempts to apply the appropriate qualitative findings to build and/or test an instrument to best suit the audience (Creswell, 2014). Therefore, this study employed a multi-tiered approach, including the five methods described in this chapter and summarized below:

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Methods 1 and 2) A series of semi-structured interviews were conducted with two target groups: experienced real estate agents and recent first-time homeowners. These two groups were selected as they were considered to be the most knowledgeable populations with respect to the intricacies of the first-time home buying process, and would offer different perspectives. The data collected in these phases would inform the content of the cards that were subsequently designed.

Method 3) The researcher evaluated several diverse creative, supportive, and decision-making tools and resources currently on the market by applying the design guidelines assembled from the criteria presented in the literature review. The visual characteristics and formal design qualities that emerged across the resources would inform the design features of the cards that were subsequently created.

Method 4) The data from the previous methods was synthesized to establish the design principles and guidelines for designing a home buying decision-making toolkit. Prototypes for the card-based toolkit were developed.

Method 5) With the home buying preparation toolkit 'The 'Prep Deck' prototype in hand, a series of usability testing sessions were performed with first-time home seekers. This allowed the researcher to learn about various aspects of the performance of the decision-making toolkit, 'The Prep Deck'.

All five methods formed the exploratory sequential approach of this study, as depicted in Figure 6 below. Methods 1 & 2, the semi-structured interviews, were conducted in parallel within the same time frame, gathering the initial information sequence. Method 3, existing decision-making tools evaluation followed, and in conjunction with method 1 and 2 informed the next phase, the prototype creation of Method 4, resulting in supporting the final methodology of prototype testing and questionnaire.

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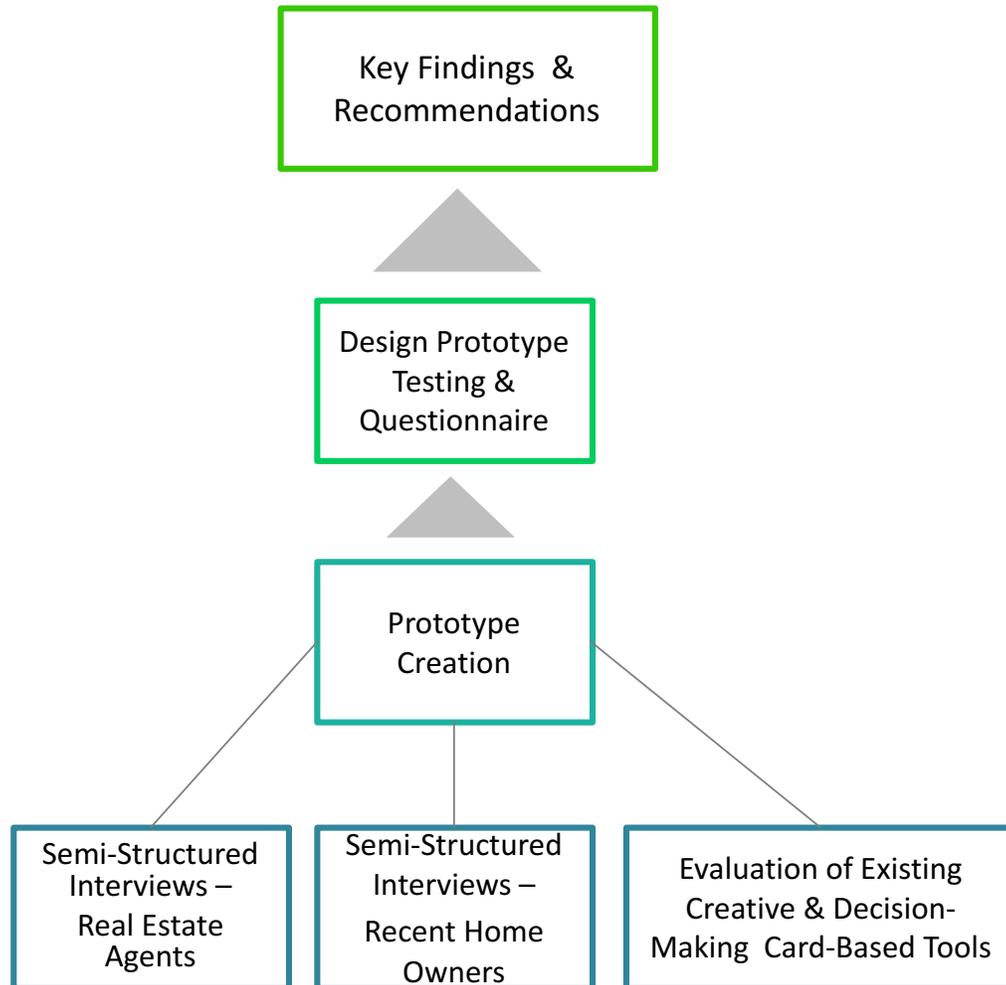


Figure 6. Methodology Structure.

Prior to the data gathering, an ethics application and clearance through the Carleton University Research Ethics Board (CUREB-B) was submitted, which was acquired on November 16, 2016 (see Appendix A). Semi-structured interviews were conducted until January 2017. A sample email participation request was sent out to potential real estate expert candidates and recent first-time homeowners to interview (see Appendices B & C). Upon receiving a positive response, a Real Estate Agent Consent letter or a Recent First-time home owner's consent form (see Appendices D & E) was sent to the appropriate parties, which was to be filled out and returned prior to

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the interview. For each interview, one copy of the consent letter was retained and stored in a secure location and the other given to the participant. The researcher used a snowball effect to recruit real estate agents known to friends, who in turn suggested other colleagues. Also, cold calls/emails were made to real estate agents listed in the on-line real estate board directory. One participant sent a recruiting invitation through their internal office bulletin board, which also resulted in a few participants.

3.1 Semi-Structured Interviews of Experienced Real Estate Agents

Method 1 included looking at a broader picture of the real estate market with the first group. This user group consisted of experienced real estate agents, with a minimum of five years' experience, who have had several first-time homebuyers in their repertoire. The interviews probed for an understanding of the process, attributes, requirements, wishes, and planning levels of first-time home buying clientele from the perspective of industry professionals. Real estate agents work with varied clientele, which puts them in an ideal position to attain knowledge of who the first-time buyers are and what their unique needs, wants, expectations, experiences and preparation levels are, and how they look to the professionals to aid them through the process. The series of questions developed for these subject experts varied from specific questions to more open-ended inquiries to address the broad scope of the first-time homebuyers' experiences when purchasing a home (see Appendix F).

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Out of all the potential real estate agent participants, eight agreed to be interviewed. The interviews were conducted between late November 2016 and early January 2017. Two of the participants were interviewed at their workplace, one was interviewed at a coffee establishment and the remaining five participants were interviewed via phone as per their requested preference. The interview took between forty-five minutes and one hour to complete. The interviews were recorded: a sequence of questions was asked and written notes were recorded on a printed copy of the interview questionnaire for each participant. To remain neutral and impartial, individual codes were assigned for each participant (From Real Estate agent (REA) 1 to 8) to ensure anonymity of the participants. In addition, their gender, age and/or specific professional activities remained concealed. All candidates were selected for the pool of individuals from Ottawa, Ontario, Canada including two women and six men ranging from mid-thirties to early fifties.

3.2 Semi-Structured Interviews of Recent First-time Homeowners

While simultaneously interviewing professional real estate agents, semi-structured interviews with the second target group were also conducted. The second target group consisted of recent homeowners who purchased their first home in the past one to three years. The queries were directed at this group since they would have recently experienced the home buying process and it would still be fresh in their minds. In addition, they would have had the time to gain some perspective, inhabit their home, and reflect on their journey. The interviews probed for an understanding of what first-time homebuyers go through as novice participants when entering the real estate

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market, how aspiring homebuyers become informed, and how they navigate and feel before, during, and after the process.

The series of questions that were established for these subjects varied from defined topics to more open-ended questions to learn about the extent of their home purchasing experience from their perspectives (see Appendix G).

The recruitment of recent first-time home owner candidates came from referrals from friends and acquaintances as well as recommendations from real estate agents from the professional target group. Out of all the potential participants, eight agreed to be interviewed. Interviews were conducted between late November 2016 and early January 2017; three of the participants were interviewed at their home; and the remaining five participants were interviewed via phone as per their requested preference. The interview took between forty-five minutes and one hour to complete. The interviews were recorded, a sequence of questions was asked, and written notes were recorded on a printed copy of the interview questionnaire for each participant. To remain anonymous, individual codes were assigned for each participant (From Homeowner (HO) 1 to 8) to ensure non-distinguishable attributes of the participants, their gender, age and/or specific professional activities remained concealed. All candidates were selected as a pool of individuals from Ottawa, Ontario, Canada including five women and three men ranging from mid-twenties to mid-thirties.

3.3 Analysis Approach to the Semi-Structured Interviews

The approach was similar for both target groups– the real estate agents and the recent first-time homeowners. The interview questions were generally asked following a pre-planned sequence approved by the Ethics Board. However, certain participants would elaborate on a question in a way that would lead to answering a later question or add information to the overall data collected in the interview. Overall, the flow of the interviews was organized in such a way as to allow the conversation to cover all the pertinent questions and encourage the participants to give examples, clarifications, or provide follow-up open-ended information to gather as much pertinent information as possible. During each interview, the participant's response was written down in short form to retain the key points of the conversation. Afterward, the recording was revisited to ensure a complete record of the findings, and additional notations would be made as necessary.

The next step involved creating two matrices organizing and outlining the answers provided by the (a) the real estate agents and (b) the recent first-time homeowners. According to Atkinson (1996), "coding is usually a mixture of data, summarization and data compilation. It involves breaking the data apart in analytically relevant ways in order to lead towards further questions about the data". Subsequently, Jonny Saldana's (2016) coding method was adopted to extract and condense the findings. The coding of the qualitative data consisted of three coding levels, starting with the broader answer, moving to the more specific themes, and then to the key qualities mentioned. These established patterns within the data. A pattern refers to repetitive, regular or consistent occurrences of action/data that appear more than twice.

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At a basic level, pattern concerns the relationship between unity and multiplicity (Stenner, 2014). The first column (Coding 1) includes the raw data, noting participants' answers in short sentences, the second column (Coding 2) consists of the preliminary codes– the key themes of information, and the third column (Coding 3) highlights the final codes– the most basic elements of the subject matter. This was the initial approach to exploring and organizing the data and make it more manageable. Two additional breakdown columns were included to further analyze the data and extract insights and observations linking the information (see sample Table 2).

Question - Q 5 : How did you find the house buying process? Did you have challenges?				
Coding 1	Coding 2	Coding 3	Insights	Links / Connections
<p>Stressful, the biggest challenge was communicating with husband and getting on the same page.</p> <p>They had many strict criteria / parameters and felt that their choices were limited because of the must haves</p>	<p>Stressful. Communication and getting on the same page with partner. Strict perimeters, limited choices.</p>	<p>Stressful. Communication barriers. Limited choices, for criteria.</p>	<p>Most people found the experience stressful and challenging with the financial, legal or complexity of information aspects.</p> <p>Having a good support team of professionals and/or partner to navigate thought the many steps was an asset.</p>	<p>A complex process that has many implications and one of the biggest personal and financial investment of their live. A great team, support + knowledge base is crucial to the experience.</p> <p>Most people found that the better prepared, the more patient they were and the individuals on their professional team made the experience smoother and less stressful</p> <p>(Q 3,4,6,7,9,10,12,13,14,15)</p>

Table 2. Coding Sample - Recent Home Owner Interview Compilation.

3.4 Comparative Evaluation of Existing Creative Tools, Decision-making Tools, and Resources

In this parallel method, seven types of paper card decks and toolkits were evaluated by the researcher including: The Creative Whack Pack, House of Cards, Zen by the brush, Art Rules and How to break them, Psycho Tests: analyze yourself and your friends, Conscientious Eating and ID Cards (see Figure 7). Most of these decks had a standard/traditional card deck composition incorporating individual cards in a package, featuring categories, visually appealing aesthetics and text. The exceptions consisted of: one toolkit resembled a card deck when folded up, yet opened out into a map format when in use and a book format. They were selected based on recommendations from the researcher's design network.



Figure 7. Variety of Existing Card-Based Creative & Decision-Making Tools.

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They were initially assessed by comparing the following factors: content layout, detailed components, visual presentations, and general design. As the process unfolded, it became important to refer to the literature for more details that could be examined. As a result, the criteria for evaluation emerged from an iterative investigation, going back and forth between the researcher's designerly knowledge and the literature. In the end, the evaluation criteria included elements to entice the audience, the first-time homebuyers, millennial group. As a result, the following visual communication and design elements were considered: appeal, comprehension and retention, soundness, unity, and beauty as well as interestingness, function, form and integrity. Additional criteria included the dimensions of: 1) purpose and scope, 2) duration of use and placement in the process, 3) system or methodology used, 4) customization and 5) formal qualities, such as the visual characteristics of form, shape, colour, texture, light, proportion, scale, balance, harmony / unity, variety, rhythm, and emphasis (see Figure 8).

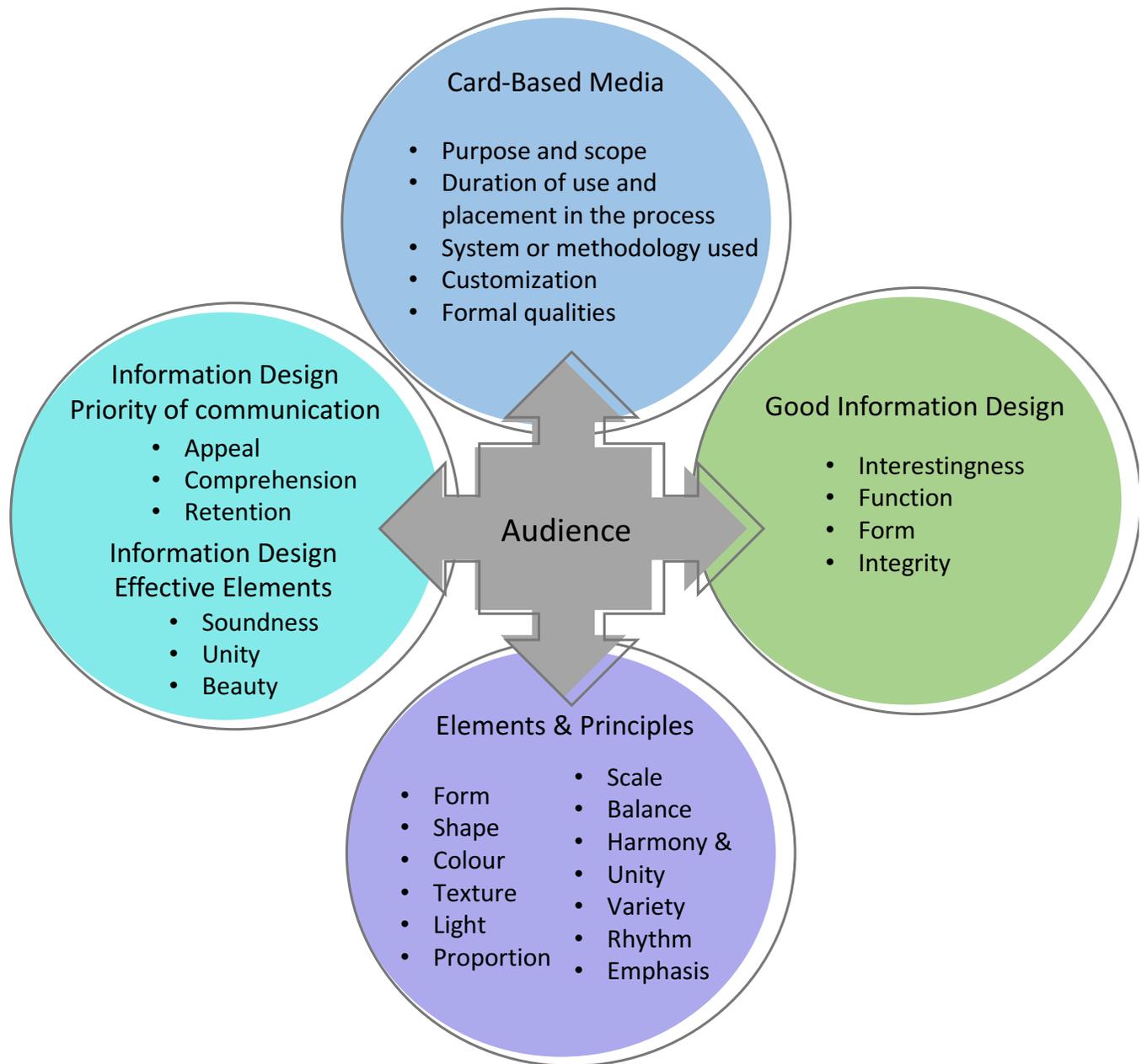


Figure 8. Decision-Making Tool – Guiding Principles.

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The researcher then conducted a comparative evaluation of the most common guidelines among the seven resource card sets, also noting the differences. The dominant card-based media dimensions and information design best practices features common categories, which formulated the initial comparison to consider in the elaboration (see Tables 3,4). The common elements and visual characteristics that emerged from each evaluation were compiled into an amalgamated set of design criteria that would be used as the second set of guidelines for the prototypes in the next method (see Table 5).

C a r d - B a s e d D i m e n s i o n s	
Purpose and Scope	General -inspiration, lateral thinking & problem solving Participatory - empathy for the content & engage user(s) in the process Context specific -focus on content to target a user or a subject
Duration of Use & Placement in the Process	Oblique cards -anywhere/anytime cards Method cards - used as needed since they provide varied methods Picture cards - used for creation Specific cards - used in a defined context or time frame, such as a workshop setting
System or Methodology	No methodology - suggests no specific instructions Basic suggestion -simple directives yet, no specific rules Specific instruction - cards include defined commands
Customization	No customization - static and unchanged Trivial customization - fixed and unchanged but permits a re-structure and grouping of the cards optimal optimization -requires the user to create, re-design or add to a card/deck
Formal Qualities / Physical Properties	Simple type - feature text or images Combined approach - joins text and images or illustrations

Table 3. Card-Based Dimensions.

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I n f o r m a t i o n D e s i g n C r i t e r i a		
Information Design – Priority of communication	Information Design – Effective Elements	Good Information Design
Appeal Comprehension Retention	Soundness Unity Beauty	Interestingness Integrity Form Function

Table 4. Information Design Criteria.

Most Common Element and Principles of Design featured in the analysis	
Form	Two-dimensional plane.
Shape	Small to medium human scale format, rectangular with rounded contour. Graphical referencing with natural and non-objective shapes.
Colour	White background, black text, high value and intensity of hues (bright / pure colours). Colour coded categories.
Texture	Smooth tactile feel with graphical material depiction or visual pattern.
Light	General illumination creating lines and planes.
Proportion	Varied text proportion with dominant graphical elements.
Scale	Medium human scale (graphics often depict the larger scale item on the card).
Balance	Asymmetrical arrangement.
Harmony & Unity	Consistency in card format, colour coded categories, similar details and characteristics throughout deck.
Variety	Different font styles and font scale, colour coded categories, varied image on each card.
Rhythm	Repetition of elements (text & graphics) - consistent throughout, colour coded classifications, horizontal orientation.
Emphasis	Larger tile, dominant graphic, colour blocking.

Table 5. Dominant Visual Characteristics of the Decision-Making Tool Evaluation.

3.5 Analysis for Prototype Development

The researcher used an inductive method for synthesis- an affinity diagram- to translate the data gathered from the semi-structured interviews and help with the evaluation of the decision-making resources. The induction method aims to generate meanings from the data set collected in order to identify patterns and relationships to build a theory/concept. “The general inductive approach provides an easily used and systematic set of procedures for analyzing qualitative data that can produce reliable and valid findings” (Thomas, 2006).

The affinity diagram allowed new information and themes to emerge from the data leading to the creation and groupings of results by arranging clusters of insights into categories.

During Synthesis, designers visually explore large quantities of data in an effort to find and understand hidden relationships. These visualizations can then be used to communicate to other members of a design team, or can be used as platforms for the creation of generative sketching or model making. The action of diagramming is a way to actively produce knowledge and meaning (Kolko, 2010, P.15).

This initially produced two large format paper boards on a wall (see Figures 9 A & B), one for the real estate agents and one for the homeowners. Each board included the interview questions and the final colour coded answers, (aqua for the homeowners and pink for the real estate agents). Subsequently, the key answers from the two groups were combined into common themes.

Once the groupings begin to emerge through the process of organization, the groupings can be made explicit by labeling them. The grouping label captures both the literal and the implied contents of the group—it makes obvious the

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meaning that has been created through the process of organization (Kolko, 2010).

The emerging themes (groupings) led to the creation of four categories: 1, Get Ready, 2, Tips and Hints, 3, Key Players, and 4, Resources (see Figures 9 A & B, 10 & Tables 6, 7, 8).

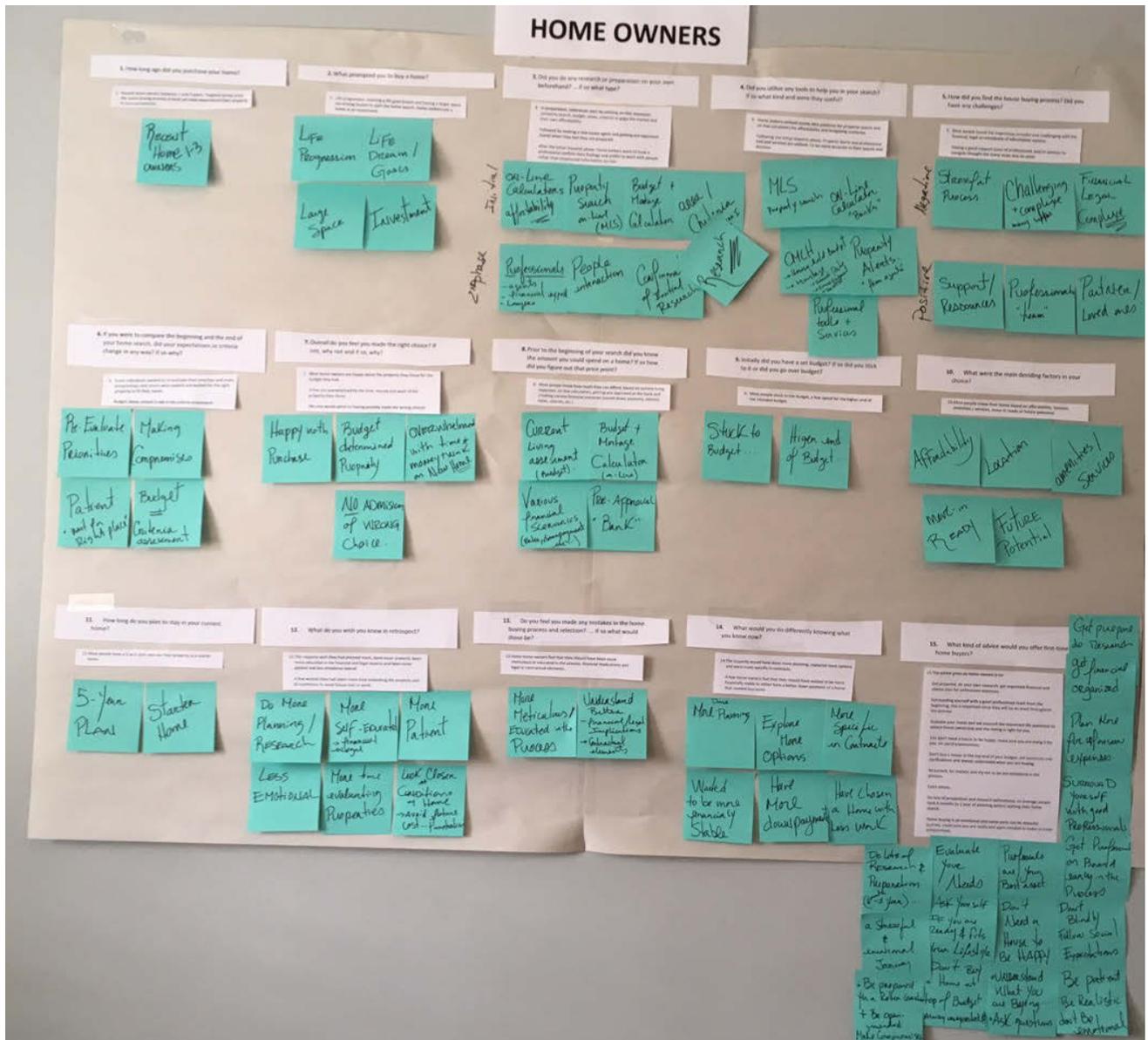


Figure 9A. Affinity Diagram (Step 1- Homeowners – HO).

How Design Tools Facilitate Right-sizing Choices for First-time Homebuyers

Recent Home Owners

Q 1 : How long ago did you purchase your home? (years?)

- Recent- 1-3 years

Q 2 : What prompted you to buy a home?

- Life progression
- Life dream/goal
- Larger space
- Investment

Q 3 : Did you do any research of preparation on your own beforehand? If so what type?

- | | | | |
|---------|---|-----------------------|--|
| Initial | <ul style="list-style-type: none"> On-line calculator – affordability assessment Property search on-line Budget & mortgage calculator Areas & criteria list | 2 nd phase | <ul style="list-style-type: none"> Professionals – (agent, financial experts, lawyer) People interaction Confirmation of initial research |
|---------|---|-----------------------|--|

Q 4 : Did you utilize any tools to help you in your search? If so, what kind and were there useful?

- On-line calculators – Banks
- MLS Property search on-line
- CMHC – household budget- Mortgage (interest rates, down payment, debt)
- Property alerts (from agents)
- Professional tools + services

Q 5 : How did you find the house buying process? Did you have challenges?

- | | | | |
|----------|--|----------|--|
| Positive | <ul style="list-style-type: none"> Support/ Resources Professional team (agent, financial experts, lawyer) Partner / loved ones | Negative | <ul style="list-style-type: none"> Stressful process Challenging- complex, many steps Financial / legal aspects complex |
|----------|--|----------|--|

Q 6 : If you were to compare the beginning and of the end of your home search, did your expectations or criteria change in any way? If so how / why?

- Re-evaluate priorities
- Making compromises
- Patient – wait for the right property
- Budget evaluation
- Criteria assessment

Q 7 : Overall do you feel you made the right choice? If not, why not and if so, why?

- Happy with purchase
- Budget determined property
- Overwhelmed with time & money & work with new home

Q 8 Prior to the beginning of your search did you know the amount you could spend on a home? If so how did you figure out the price point?

- Current living assessment (budget)
- Budget & mortgage calculators (on-line)
- Various financial scenarios (interest rate, down payment, etc.)
- Pre-approval from financial institution

Q.9 Initially did you have a set budget? If so did you stick to it did you go over budget?

- Stuck to budget
- Higher end of the set budget

Q 10 What were the main deciding factors in your choice?

- Affordability
- Location
- Amenities/services/ transit
- Move-in ready
- Future potential (investment)

Q 14 What would you do differently knowing what you know now?

- Done more planning / research
- Explore more options
- More specific in contract
- Waited to be more financial stable
- Saved up more down payment
- Have chosen a home with less work

Q 11 : How long do you plan to stay in your current home?

- 5-year plan
- Starter home

Q 15 What kind of advice would you offer 1st time home buyers?

- Get prepared, do research & financial organized
- Plan for unforeseen expenses
- Surround yourself with good professionals
- Get professionals on-board early
- Don't blindly follow social expectations
- Be patient, be realistic and less emotional
- Professionals are your best asset
- You don't need a house to be happy
- Understand what your are buying, ask questions
- Evaluated your needs (short/long term)
- Ask yourself if you are ready and a house fits your lifestyle
- Don't buy a house at the top of your budget, always some un-expected financial implications
- Do lots of research & preparation (6months – 1 year)
- Be prepared for a stressful & emotional journey
- Be prepared for a roller coaster ride
- Be open minded – make compromises

Q 12 What do you wish you knew in retrospect?

- Do more planning / research
- More self-education on financial/ legal aspects
- More patient
- Less emotional
- Look closer at the condition of the home to avoid future cost & frustration

Q 13 Do you feel you made any mistakes in the home buying process and selection? If so what would those be?

- More meticulous and educated about the process
- Understand better – financial/ legal implications & contractual elements

Table 6. Affinity Diagram (Step 1) – Common Themes (Homeowners- HO).

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Real Estate Agents

Q 1 : Do you provide any tool or handouts to 1st time home-buyers before embarking on the home search?

- Yes, tools

Q 2 : Q 2 : Please list the types of tools offered or referred to. (N/a, if not applicable)

- Face to face information
- Information package
- Property search / showings
- Examples of contracts

Q 3 : Out of the tools listed above, which ones are the most helpful for 1st time home-buyers in assessing their home buying direction? (n/a, if not applicable)

- Hand outs
- Worksheets
- Information and process material
- Professional guidance

Q 4 : Who are the most common 1st time home-buyers? (gender / age range/ status)

- Single
- Couple (no kids)
- 25-35 years old (millennium)

Q 5 : What are your general impression of 1st time home-buyers in Ottawa?

- Tech savvy
- Done basic research
- Not thorough research
- Have many questions

Q 8 How do they look to you, the agent to guide them through the assessment of house affordability?

- Advice
- Resources
- Professional knowledge
- Assessment of situation / financial model
- Facilitate the process

Q 9 How do 1st time home-buyers know about the supplementary costs of home buying (legal fees, land transfer taxes, moving costs, mortgage broker fees, etc.)?

- Vague knowledge
- Only an overview
- Not a complete

Q 10 How do 1st time home-buyers know about the long term costs of a home / yard (heating/ cooling, water, electricity, land taxes, home upkeep or improvements ,etc)?

- Only a basic understanding
- Unprepared
- Need real estate agent to guide them

Q 11 Are 1st time home-buying purchasing for their immediate or future needs?

- Immediate needs
- Short term goals

Q 12 What is the average length of time that 1st time home buyers reside in their first home? (? Years)

- 5-year plan

Q 6 : Generally, what seems to be on their wish list in term of...

Location, New VS Older Home (age range), Type of home, Outdoor space, Interior layout / Interior finishes, Light & Orientation, Convenience to amenities, service , transportation.

- Urban, green belt & suburbs (financially driven)
- Resale home but updated / move-in ready
- Town-home (freehold) / condo
- Outdoor – low priority (small private space)
- Open-concept - functional, updated, dependent on location and budget
- Light – general brightness / orientation – culturally dependent
- Amenities/ service / transportation – high priority

Q 7 : Do 1st time home-buyers know how much they can afford to spend on a home? (yes or No)

Q7 A How do they attain that information (come to that conclusion if Yes)?

Q 7 B / C Are they usually realistic in their house affordability projections? Does that change over time?

- Have a generally idea of a affordability (A)
- On-line calculator (B)
- Pre-approval – Financial institution (B)
- Personal budget prediction – based on current living situation (B)
- Conservative in affordability (C)
- Comfortable with lower to medium range budget (C)

Q 13 Are there common ways for 1st time home buyers to choose the location of their home?

- Proximity to work
- Commuting time ~ 30 minutes
- Affordability
- Safety

Q 14 Ultimately, what do 1st time home buyers base their decisions on when deciding on a particular home? Please rank them from 1 to 10.

- Most
- Location
 - Finances
 - Services/ amenities / transportation (lifestyle)

- Least
- Outdoor Space
 - Familiarity to the area
 - Proximity to loved ones

Q 15 Is there a difference between the 1st time home buyers and the veteran purchasers? If so how.

- 1st time home buyer ...
- Not a forever home – short term goals
- Safety a concern
- No work to be accomplished (updated / move-in ready)
- Adverse to improvement – have a hard time to see the potential or how they would accomplish (lack of vision)
- Don't consider long term financial implications
- More emotional buyers
- Want it all
- Get financial help from parents (a rising %)
- "Keeping" their lifestyle is curtail
- Looking to professionals for guidance

Table 7. Affinity Diagram (Step 1) – Common Themes (Real Estate Agent- REA).

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Affinity Diagram - Category

GET READY

- Want it all
- Complex & challenging process
- Vague information
- Overview / help / questions
- Low to mid range budget (not higher end = house poor)
- Being realistic / conservative
- Research not complete
- Unprepared(feel)
- Affordability
- Future potential/ possibilities
- Proximity to work
- Open concept/ functional
- Move-in ready
- Get financial help from parents
- Emotional buyers
- No work – updated
- Location / safety
- Amenities / transportation
- Larger space
- Investment
- Location / services
- Urban – Budget driven
- Outdoor low-priority
- Town-home / condo
- Light orientation, culturally based
- Commuting time , max 30 min
- Budget determines property details (location, house type, interior layout, etc.)

TIPS & HINTS

- Evaluate your needs
- A stressful / emotional journey
- Don't blindly follow social expectations
- Have a bigger down payment
- Don't buy a home at the top of your budget
- Be prepared for a roller-coaster ride
- Be open-minded / make compromises
- Ask yourself if you are ready and it fits your lifestyle
- Be self-educated, do a lot of research, take your time (6 to 12 months)
- Wait to be more financially stable
- Explore various options
- Be patient, less emotional
- Re-evaluate your priorities
- Understand what you are buying
- Get professionals on board early , best asset
- Look closely at the condition of the house
- Don't need a house to be happy
- Get financially organized
- Plan for more expenses
- Be more specific in contracts

KEY PLAYERS

- Face to face
- Professionals – who are they
- Professional knowledge
- Hand outs
- Advice from experienced people
- Pre-approval – Bank
- Examples of contracts
- Information regarding the process
- Tools and services
- Partners / support
- Professional team
- Agent interaction/resources
- Confirmation of initial research
- People interaction

RESOURCES

- Research – on-line general search
- Resources – questions
- Information packages from agents
- Worksheets
- Current living assessment
- Budget – Personal
- Mortgage calculators
- CMHC – household affordability / mortgage calculator
- Property showings
- On-line mortgage calculator (banks)
- Property search (MLS)
- Various financial scenarios (personal spreadsheet)
- Area assessment (google maps)
- Walk-score

Table 8. Affinity Diagram (Step 2) – Category Results.



Figure 10. Affinity Diagram (Step 2) – Category Creation.

3.6 Prototype Development

Designers may follow a user-centered discovery process to immerse themselves in a particular subject or discipline, and then go “incubate” that material. After a period of reflection, they will produce a tangible artifact as a visual representation of the reflection (Kolko, 2010, P.15).

As a result of the synthesis, content, information design communication, effective elements and good design criteria as well as the formal qualities, the development of the prototype followed. Each concept took into consideration: the audience, the first-time home purchaser; averaging 25-35 years of age, the purpose; an informative, fun, interactive decision-making tool and the visual characteristics of elements and principles which were featured in the existing card decks to formulated the information distribution and visual options. Each category featured the leading visual characteristics, text content and placement (elements and principles of design featured by Ching) to create varied interpretations of card-based information design tools (Ching, 1987). Focusing on

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The various interpretations led to the creation of the card prototypes by eliminating certain elements and focusing on the more successful aspects to cumulate into leading options. These included medium scale cards, simple graphics, white background with black text, colour coded (bright hues) categories and varied font size and text. (see Figure 12).



Figure 12. Varied Prototypes.

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A final review of the visual characteristics of elements and principles of design by Francis D.K. Ching were considered and applied to establish the final card-based toolkit prototype (see Figure 13). As this is a prototype, it is not a comprehensive card deck. The more pertinent topics, five per category were selected to keep a consistency in the format and offer a more manageable testing platform. The five topics within each category, resulted in a total of twenty cards plus the cover card creating the composition of the 'Prep Deck' Prototype. The five chosen topics were generated from the recurring material extrapolated from the interviews with the recent homeowners and the real estate agents. Each topic, relating to the theme reflects either fundamental information or facts, a probing lifestyle question or a pertinent action to take to facilitate the home buying preparation and right-size choices.

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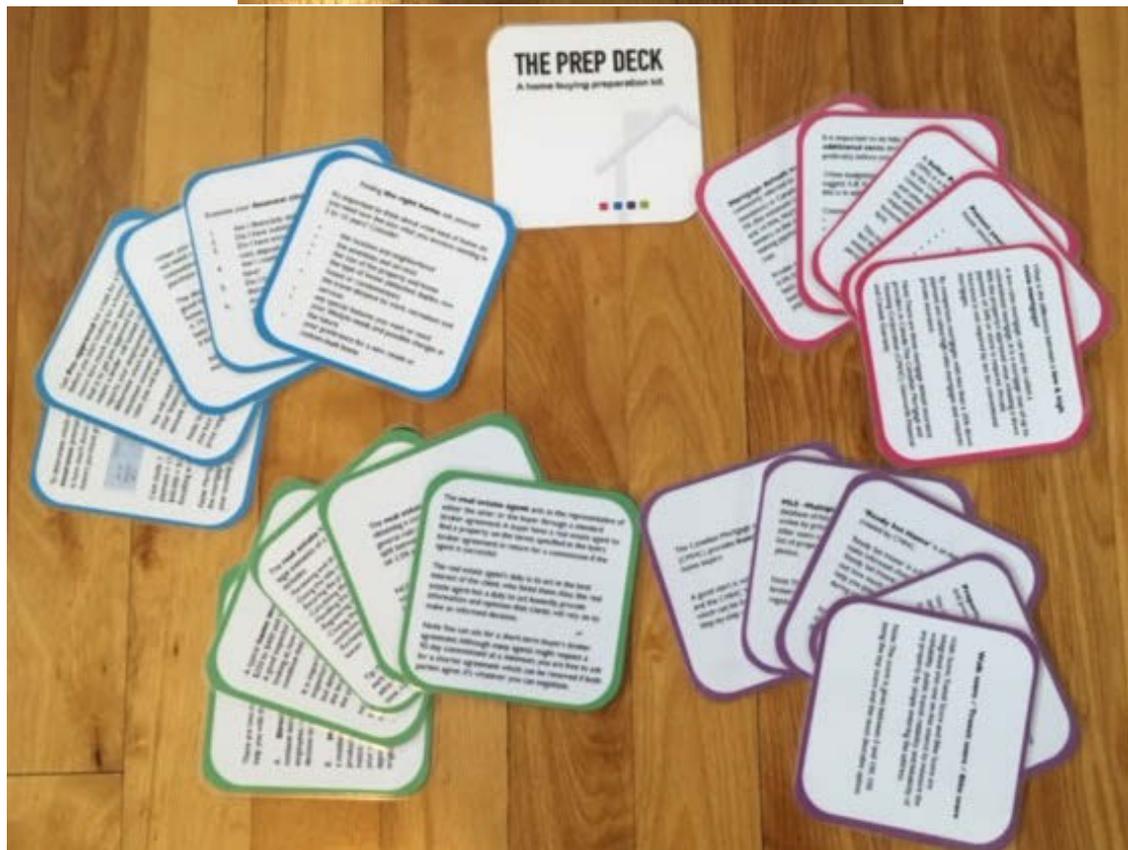


Figure 13. Card-Based Prototype – The 'Prep Deck' (Side A & B).

3.7 Usability Testing of Decision-Making Tool Prototype

With the final version of the prototype in hand, Method 5 involved one-on-one usability testing sessions in-lieu of a workshop to (1) accommodate the participants' schedules and (2) to allow participants to freely express their thoughts and feeling without judgments from others. This seemed to be the best approach to achieve to goal of gaining more intimate and meaningful data.

Prior to the usability testing phase, an addendum application was formulated for ethics clearance through the Carleton University Research Ethics Board (CUREB-B), which was acquired after the fact, due to a technical difficulty, on June 26, 2017 and the testing was conducted until May 2017 (see Appendix H). Email participation requests were sent out to reach out to potential candidates (see sample in Appendix I). Upon positive feedback, a convenient time and location to perform the usability testing was agreed upon. For each testing session, each first-time home seeker was provided with a Consent letter (see Appendix J), a copy of the consent letter was retained and stored in a secure location and another copy was provided to the participant. Candidates were recruited through friends and acquaintances, as well as recommendations from the real estate agents from the first target group. All candidates were selected as a pool of individuals from the Ottawa, Ontario, Canada.

Recruitment proved to be challenging; multiple attempts were made to gain a larger pool of participants, yet, due to time constraints and data collection boundaries,

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the study had less than anticipated contributors. Of out all the potential participants, seven participated, two single men and five women, four in relationships and one single ranging from mid-twenties to early-thirties and they were all interviewed individually. The usability testing was conducted between mid-April to the end of May 2017; three of the participants were tested on the Carleton University campus; three were tested at a local coffee shop and the remaining individual was tested at an office setting as per their requested preference. The testing took between forty-five minutes and approximately one hour to complete. A video-recording was made at each of the sessions and participants would be asked to interact with the 'Prep Deck' cards and to make comments / think out loud while the researcher noted remarks and the person's overall approach. Often the cards would prompt questions and/or a brief discussion to clarify the topic, which were answered to ensure the information was well-defined. At the end of the card-based interaction, the participants were given a short questionnaire to capture additional feedback (see Appendix K). To remain unbiased and objective, individual codes were assigned for each participant (From Home seeker (HS) 1 to 7) to ensure anonymity of the participants, their gender, age and/or specific professional activities remained concealed.

The target group consisted of first-time home seekers who have an interest in owning a home in the near future. The focus group was selected since they generally have no or very little knowledge of the real estate market, the process of purchasing a home and/or the financial, time/effort and lifestyle implications thus, making them ideal candidates to test a home buying preparation toolkit. The objective of the investigation was to discover: 1) if the card design communicated the information clearly, 2) how

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participants responded to the visual characteristics of the design (likes/dislikes/comments), 3) how the cards influenced them, 4) if and how would individuals utilize the toolkit, and 5) how can the card-based tools facilitate their potential home search. The intent was to offer first-time home seekers a resource for making informed decisions about home purchasing, right-sizing, and lifestyle choices, as well as for building upon that knowledge throughout their lives and home purchasing needs.

3.8 Analysis Approach of Usability Testing of Decision-Making Tool Prototype

In the next phase, a matrix classifying the answers provided by the potential home seekers was created. Through analysis, the data was coded into six categories. They were: the identification of the participant and the duration of the session, the participant's statements, the emerging codes, the summarization of information, the identification of the links and the general observations and comments (see Table 9). The participants were engaged and interested in gaining more knowledge and offered great feedback to solidify positive aspects and offer improvements.

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Participants & Duration	Statements	Emerging codes	Summarizing	Links	General Observations
<p>HS 3 48:72 minutes</p>	<p>Yes, I would use this tool, a good reminder of things to consider when buying a house. After an initial on-line search, a link would redirect to purchase the kit. I would use this tool as a starting discussion with a partner, to eventually lead to a more in-depth search, or search for points mentioned in the list. A roadmap to buying a house. Improvement would be to number the cards within the categories, (# to other related cards in the various categories), improve the resolution, Some clarification / reference to more technical terms. I learn a lot about the home buying process and the parties involved. Overall Great Idea!!! Like the case studies / examples, makes it more clear. Ask yourself is a good way to evaluate varied elements, considering what the 5 to 10 years might bring. Tips & Hints feels like the same elements as the Get Ready category, but categories are important. New information: Low/high mortgage, additional cost (%), SPIS, need a lawyer. Nice to have lists, bullet points makes it clear. Make sure you make it gender neutral. Do you really need a real estate agent? Clarify what a broker agreement is, not clear. clarify in home inspection, what happens if you find a problem with the house. Good to know the financial options, what would be the advantages of one vs the other. Resources, is a great category, good to know where to get more details. Categories and graphics are important. That is why infographics are so popular. If categories were not included, it would be boring and overwhelming and I would give up. Like the physical cards, can have them with you at all times during the process, loves board / card game and this remind me of that. DESIGN Feedback: :)Simple, nice white space and graphics. Color coding is great, easy to identify, likes the choice of color. Like the bold text to quickly identify the topic of the card. Liked the title, 'Prep Deck', feels like a board game and playful. Instructions not necessary, pretty strait forward. If you did use reference #'s for each card, maybe you could explain that on the back of the title deck. :(Some cards have to much text but understand the need.</p>	<p>Themes: Things to consider and research further, a road map of what to consider when buying a home. Use: Good starting point, play & have a discussion with partner that would lead to more research. Format: Card preference, more engaging, creates an interactive playful way to start a conversation. Number the cards in each category (ex: Pink 1) & reference to other relating cards. Sequence: Get Ready, is logical as the 1st category and the resources at the end to wrap it up but the other 2 categories could be interchanged. Numbers (#) to link the different elements that relate to the different information. Design: Simple, good use of space, graphics and color coded. Bold text is good, like the title, playful but direct. Useful: Categories help group things, create content, help with navigation. # referencing bonus.</p>	<p>Considerations Road Map Discussion Starting point Grouping information Interactive Engaging Playful Navigation Card Format</p>	<p>The 'Prep deck' can be used as a road map to comprehend the process, create discussions, evaluate needs and further various research areas that individually applies. Since it presents a playful way to group information, it can further engage the users to navigate the home buying preparation and process with assurance.</p>	<p>Was immediately drawn to the cards and wanted to engage with them since it reminded him of a board game and he enjoys them. A good way to group information in a playful way that gets people excited, more informed and confident regarding the process and what they want. Realized that is a complex process and it requires time, effort and financial stability to purchasing a home.</p>

Table 9. Usability Testing – Sample Matrix.

Chapter 4. Findings & Results

This chapter presents the key findings from each method; the real estate agents' interview results, recent homeowners' interview results, evaluation of existing creative decision-making tools data, prototype development data, and the prototype usability testing discoveries. The findings are organized in the order of data collection and analysis, since the findings of one method subsequently informed the next phase.

4.1 Real Estate Agents Response to Interviews

The findings, based on the opinions of the real estate agents gathered from the interviews (eight total) were sorted into six main categories: 1) Tools/resources, 2) Target market, 3) Wish list, 4) Preparation, 5) Implications, and 6) Distinctive findings. They are summarized in Table 10 and presented here.

Tools and Resources

- All eight agents provide various kinds of tangible tools to clients. From their perspectives, providing tools is a basic service that they provide.
- Agents engage in face-to-face interaction with the buyer, hence, they are a crucial resource themselves, in addition to information packages, paper work examples combined with showing various properties.
- Agents are the facilitators of the information and will direct clients to other resources and professionals, such as lawyers, inspectors, contractors, etc. to aid in the process.
- The most valuable tools for the first-time buyer are handouts about the process, the realtor themselves, and worksheets/information about the financial process.

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- Many on-line tools and information are available (and many start there) yet, homebuyers gravitate to the professionals (real people) to either obtain supplementary/accurate information or confirm their initial findings.

Target market

- The first-time home buyer is likely single or part of a couple, without kids, and between 25 and 35 years old. The age range indicates a more financially stable clientele, (completed school, have a bit of money saved up, are more established, have a career, etc.) and/or starting a new phase in their lives (coupling, new baby, investment), hence, they are entering the property market.
- The average first-time buyer is a millennial who thinks differently than the previous generations when it comes to ownership, where lifestyle choices often are more important than the physical structure.
- The first-time home buyer is tech savvy and generally conscious of the important factors of buying a home. They do basic property, location and financial research in preparation, but many details and implications are overlooked.
- The first-time home buyer is looking to find an urban home in the city, (the green belt) or the suburbs, (this is mainly financially driven). They want it all, they don't want to compromise on the overall home package (move-in ready or limited work) and want to keep the same lifestyle, however they are financially concerned and don't want to exceed their budget.
- After the realization of the market limitations, some of the compromises made in terms of their wish list are financially based; what can they afford given the top five items on their list of must haves. While the type of residence is also financially driven, location and lifestyle often overrides the dwelling type, e.g.

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condo vs. town home vs. detached. The first-time homebuyers will average a five-year time frame before either outgrowing their initial needs or wanting to move on.

Wish list

- The first-time home buyer has a preference for the urban core where services, amenities, and convenient comforts to their daily activities or obligations (e.g. work). They also want an open concept, functional interior arrangement but are dependent on affordability and safety.
- They are mostly looking for something that is updated, yet, willing to make small improvements depending on the property location (neighborhood is more important than move-in ready conditions).
- Outdoor space is low priority for the first-time home owner, who is content with a small private space.
- Orientation to light isn't a concern for many first-time homeowners, except for homebuyers who are looking for feng shui characteristics in a home which relates to the spatial arrangement and orientation in relation to the flow of energy.

Preparation

- First-time homebuyers come somewhat prepared to search for properties. The first-time home owner knows how much they can spend on their home. Many on-line tools and information are available and that is where they start to obtain financial, property, and general home buying information before turning to the professionals to either obtain accurate information or confirm their initial findings.

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Implications

- The first-time home owner is likely realistic about what they can spend and have a comfort level of affordability they mostly stick to. They might raise their initial budget but try to stick to the lower to mid-range of what the bank will loan them.
- The first-time home buyer knows there are extra initial costs associated with buying a home, but not how much or for what. Long-term cost is evaluated on their current living cost as a base, but they usually don't have knowledge of the overall cost of homeownership.

Interview with Real Estate Agents

CATEGORIES / CODE

General Responses Summary

1. Tools / Resources

1. Most first-time home seekers do their own initial inquiries on an on-line platform. They research scattered tools and resources in the internet to then seek industry professional guidance to confirm their findings or to direct them into the detailed process and information. Another segment of home seekers initiate the home search by mostly relying on a real estate agent to provide them with all the information and resources.

2. Target Market

2. A. First-time home buyers are millennials who are embarking on a new chapter in their life and feel home ownership is the next step and will add value to their lives. They look mostly at the short term (average of 5 years), financially (interest rate and overall costs), location, type of dwelling and features since they mostly don't consider their first home as a forever residence. B. First-time home buyers are tech savvy and pro-active in research but miss crucial elements. Since they are novices, they have limited knowledge about the market and the details of home buying process, therefore, seek/need guidance.

3. Wish List

3. First-time home buyers want it all, keeping a certain lifestyle, proximity to daily activities, amenities, walkability and services and want a move-in ready home with little to no work. The first-time home buyers have high expectations which results in unrealistic initial outcomes. A re-evaluation of priorities and market realities is needed with the guidance of professionals.

4. Preparation

4. Many first-time buyers pursue basic preparations, (on-line property search, on-line calculators, pre-approved at the bank) and they are financially concerned and conservative (want to stick to the lower end of their budget).

5. Implications

5. First-time buyers often get emotionally involved, overwhelmed and stressed during the home buying search and purchasing. They have a general idea of the initial cost of buying a home but not the specific details or the long-term financial implications.

6. Distinctive Findings

6. Many first-time home buyers get help financially from loved ones (new trend in the last 5-7 years). Initially, first-time home buyers don't reference safety as a priority yet it becomes a concern when narrowing down a serious property. First-time home buyers lack vision and can't see the potential in a property.

Table 10. Interview with Real Estate Agents Summary.

4.2 Recent First-Time Homebuyers Response to Interviews

The findings from the recent first-time home buyer's interviews (eight total) were sorted into six main categories: 1) Tools/resources, 2) Target market, 3) Wish list, 4) Preparation, 5) Implications, and 6) Advice. They are summarized in Table 11 and presented here.

Tools and Resources

- Initially they all search on-line for properties perimeters, mainly using MLS - (Multiple Listing Service) / Realtor.ca and on-line calculators (property search, budget, areas, criteria) to gauge affordability, property options, and location.
- Subsequently, they seek professional assistance starting with a real estate agent that in turn informed or referred them to other professionals (lawyer, inspectors, financial personnel).

Target market

- Young singles or couples (no kids or starting a family), in their 25-35 years.
- All candidates had a level of the following driving factors to purchase their first home include: life progression (embarking on the next chapter of their lives), realizing a life goal/dream, having a larger space and a tangible investment.
- Six participants indicated that they have a 5-year plan and see their property as a starter home. Two participants said that this was purchased for an investment, would live in it for a few years before renting it and purchasing a second property.

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Wish list

- All individuals chose their home based on affordability, followed by location, amenities / services, move-in conditions, but, only two participants selected the property for future potential that implied renovations.

Preparation

- All individuals start the research process by exploring different on-line tools, mainly MLS - (Multiple Listing Service) / Realtor.ca and on-line calculators (property search, budget, areas, criteria) to gauge affordability and the market conditions.
- When determined that it's a feasible project, they all seek professional assistance from the different professionals to ensure accuracy and detailed information.
- All individuals initially based their affordability on current living expenses and on-line calculators. Seven out of eight got pre-approved at the bank and created various financial scenarios (varied down payment, interest rates, salaries, etc.). Only one selected the home before going to the bank for financial approval.
- Six out of the eight participants respected their initial lower budget, however two opted for the higher end of the intended budget. Never accepting what the bank was offering as they were not interested in being house poor.

Implications

- Six individuals indicated that the experience was stressful and all participants had varied levels of challenges given the financial or legal complexity of information.

How Design Tools Facilitate Right-sizing Choices for First-time Homebuyers

- Everyone indicated that having a good support team of professionals and/or partner to navigate through the many steps was an asset.
- Half the candidates needed to re-evaluate their priorities and make compromises and the others were patient and waited for the right property to fit their needs.
- Budget always played a role in criteria assessment for everyone.
- Six of the homeowners are happy about the property they chose for the budget they had, with only two feeling overwhelmed by the time, money and work on the property. None had regrets, and no one would admit to having possibly made the wrong choice.
- The majority wished they had planned more, done more research, been more meticulous and educated in the financial and legal aspects and been more patient and less emotional overall. Three homeowners wished they had taken more time evaluating the property and its conditions to avoid future cost or implications.
- Three of homeowners felt that they should have waited to be more financially stable to either have a better down payment or a home that needed less work.

Advice to other first-time buyers

- Get prepared, do your own research, get organized financially and always plan for unforeseen expenses.
- Surrounding yourself with a good professional team from the beginning is important since they will be an asset throughout the process.
- Evaluate your needs and ask yourself the important life questions to ensure that homeownership and timing are right for you.

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- You don't need a house to be happy, make sure you are doing it for you, not for social expectations.
- Don't buy a house at the top end of your budget.
- Ask questions and clarifications and always understand what you are buying.
- Home buying is an emotional and, in part, a stressful journey, make sure you are ready and open to compromises.
- Be patient, be realistic and try not to be too emotional in the process.

Interview with Recent Home Owners

CATEGORIES / CODE

General Responses Summary

1. Tools / Resources

1. Most recent home seekers conducted their own initial inquiries on an on-line platform. Utilizing informational tools, research criteria, financial preparation platforms (e.g. Google search, MLS, property alert, on-line calculators) and when they assessed their initial perimeters, obtained help and guidance of industry professional, starting with a real estate agent.

2. Target Market

2. First-time home purchaser are millennials who are embarking on a new chapter in their lives, realizing a life goal/dream, wanting a larger space and making a tangible investment. Generally, have a 5-year plan and see their current property as a starter home.

3. Wish List

3. Varied on individual preferences and situation. Budget always played a role in criteria, priorities and benchmark assessment which mainly lead to re-evaluating and comprising on wish list.

4. Preparation

4. People based affordability on current living situation, on-line calculators, getting pre-approved (financial institution) and creating various financial scenarios and mostly respected their budget perimeters, lower end of what the bank would give them. Seeking professional advice and support after initial on-line platform research.

5. Implications

5. Most people found the experience complex, stressful and challenging (financial, legal or complexity of information) and surrounding oneself with a good team of professional and/or partner as an asset. Mainly happy about their final property choice, some overwhelmed by the effort and financial implications of their home.

6. Advice

6. The majority wish they had planned more, done more research, been more meticulous and educated in the financial and legal aspects and been more patient and less emotional overall. A few wished they had taken more time evaluating the property and its conditions to avoid future cost or implications or waited to be more financially stable. Do lots of preparation and research beforehand, on average people took 6 months to 1 year of planning before starting their home search.

Table 11. Interview with Recent Homeowners Summary.

4.3 Existing Resources Insights

The data collected from these decision-making resources were reviewed in the following categories: card-based dimensions (purpose and scope, duration of use and placement in the process, system or methodology, customization, formal qualities), information design's priority of communication (appeal, comprehension, retention), effective elements (beauty, unity, soundness) and good design elements (interestingness, integrity, form, function), which reveal the dominant aspects of the collection (see Tables 12,13) (Wolfel & Merritt, 2013), (Lankow et al., 2012).

The formal qualities and physical properties were evaluated according to the principles and elements of design including: form, shape, colour, texture, light, proportion, scale, balance, harmony & unity, variety, rhythm and emphasis as visual characteristics in design composition (Ching, 1987). Each evaluated existing creative toolkit and resources is featured in Figures 14 to 20. The dominant common visual elements for each toolkit is featured in Tables 14,15,16,17 and summarized in Table 18.

How Design Tools Facilitate Right-sizing Choices for First-time Homebuyers

	Purpose and Scope	Duration of Use & Placement in the Process	System or Methodology	Customization	Formal Qualities / Physical Properties
Creative Wack Pack	General -inspiration, lateral thinking & problem solving Participatory - empathy for the content & engage user(s) in the process Context specific -focus on content to target a user or a subject	Oblique cards - anywhere/anytime cards Method cards - used as needed since they provide varied methods	Specific instruction - cards include defined commands	Trivial customization - fixed and unchanged but permits a re-structure and grouping of the cards	Combined approach - joins text and images or illustrations
House Of Cards	Participatory - empathy for the content & engage user(s) in the process	Oblique cards - anywhere/anytime cards	Basic suggestion -simple directives yet, no specific rules	Trivial customization - fixed and unchanged but permits a re-structure and grouping of the cards	Simple type - feature text or images
Conscious Eating	General -inspiration, lateral thinking & problem solving Participatory - empathy for the content & engage user(s) in the process Context specific -focus on content to target a user or a subject	Oblique cards - anywhere/anytime cards Method cards - used as needed since they provide varied methods	Specific instruction - cards include defined commands.	Trivial customization - fixed and unchanged but permits a re-structure and grouping of the cards	Simple type - feature text or images
ID Cards	General -inspiration, lateral thinking & problem solving Participatory - empathy for the content & engage user(s) in the process Context specific -focus on content to target a user or a subject	Oblique cards - anywhere/anytime cards Method cards - used as needed since they provide varied methods Picture cards - used for creation	Specific instruction - cards include defined commands.	No customization - static and unchanged	Combined approach - joins text and images or illustrations
Art Rules (And How to Break Them)	Participatory - empathy for the content & engage user(s) in the process Context specific -focus on content to target a user or a subject	Oblique cards - anywhere/anytime cards Method cards - used as needed since they provide varied methods	Specific instruction - cards include defined commands.	Trivial customization - fixed and unchanged but permits a re-structure and grouping of the cards	Combined approach - joins text and images or illustrations
Psycho Tests Analyze yourself (and your friends)	Participatory - empathy for the content & engage user(s) in the process Context specific -focus on content to target a user or a subject	Oblique cards - anywhere/anytime cards Method cards - used as needed since they provide varied methods	Basic suggestion -simple directives yet, no specific rules Specific instruction - cards include defined commands.	No customization - static and unchanged Trivial customization - fixed and unchanged but permits a re-structure and grouping of the cards	Combined approach - joins text and images or illustrations
Zen By the Brush	Participatory - empathy for the content & engage user(s) in the process Context specific -focus on content to target a user or a subject	Oblique cards - anywhere/anytime cards Method cards - used as needed since they provide varied methods	Basic suggestion -simple directives yet, no specific rules	No customization - static and unchanged	Combined approach - joins text and images or illustrations

Table 12. Dominant Card-Based Dimensions.

How Design Tools Facilitate Right-sizing Choices for First-time Homebuyers

	Information Design – Priority of communication	Information Design – Effective Elements	Good Information Design
Creative Wack Pack	1. Appeal 2.Comprehension 3. Retention	3. Soundness 2. Unity 1. Beauty	1.Interestingness 2.Integrity 3.Form 3.Function
House Of Cards	1. Appeal 2.Comprehension 3. Retention	3. Soundness 2. Unity 1. Beauty	1.Interestingness 3.Integrity 2.Form 2.Function
Conscious Eating	1. Appeal 2.Comprehension 3. Retention	2. Soundness 3. Unity 1. Beauty	1.Interestingness 2.Integrity 3.Form 2.Function
ID Cards	1. Appeal 2.Comprehension 3. Retention	3. Soundness 2. Unity 1. Beauty	1.Interestingness 2.Integrity 3.Form 3.Function
Art Rules (And How to Break Them)	1. Appeal 2.Comprehension 3. Retention	2. Soundness 3. Unity 1. Beauty	1.Interestingness 2.Integrity 3.Form 2.Function
Psycho Tests Analyze yourself (and your friends)	1. Appeal 2.Comprehension 3. Retention	3. Soundness 2. Unity 1. Beauty	1.Interestingness 2.Integrity 3.Form 2.Function
Zen By the Brush	1. Appeal 2.Comprehension 3. Retention	3. Soundness 2. Unity 1. Beauty	1.Interestingness 2.Integrity 1.Form 3.Function

*** 1,2,3 – Representing the hierarchy of features in each tool**

Table 13. Dominant Information Design Criteria.

How Design Tools Facilitate Right-sizing Choices for First-time Homebuyers

1. Creative Whack Pack

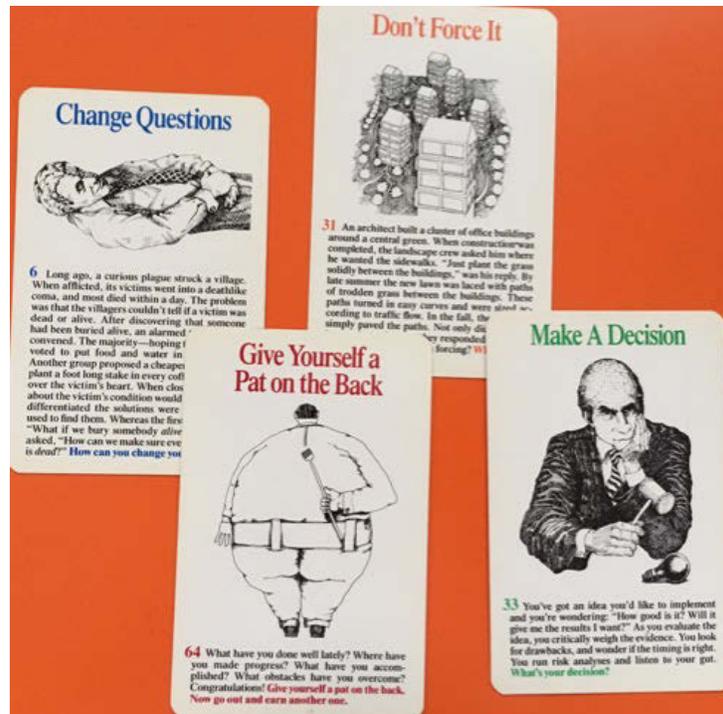


Figure 14. Creative Whack pack - Card Deck.

How Design Tools Facilitate Right-sizing Choices for First-time Homebuyers

2. House of Cards



Figure 15. House of Cards - Card Deck.

How Design Tools Facilitate Right-sizing Choices for First-time Homebuyers

3. Conscious Eating

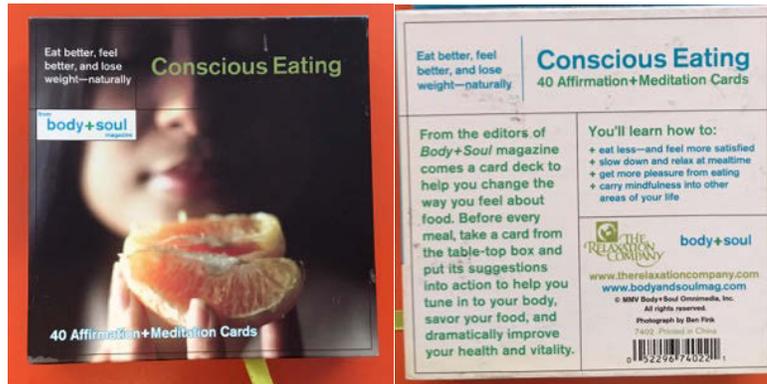


Figure 16. Conscious Eating - Card Deck.

4. ID Cards



Figure17. ID Cards - Card Deck.

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5. Art Rules (And How to Break Them)



Figure 18. Art Rules (And How to Break Them) - Card Deck.

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6. Psycho Tests –Analyze yourself (and your friends)

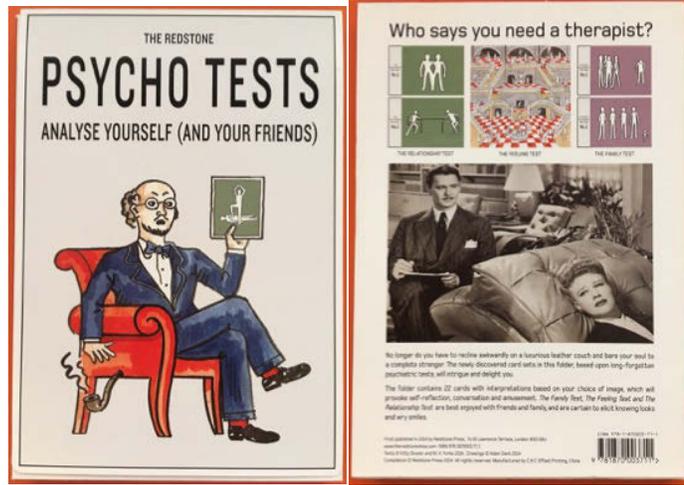


Figure 19. Psycho Tests –Analyze yourself (and your friends) - Card Deck.

7. ZEN By The BRUSH

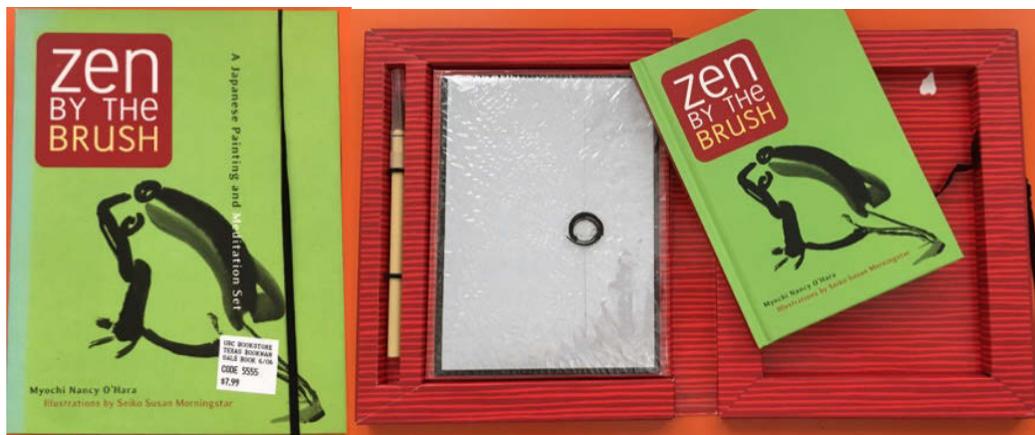


Figure 20. ZEN By the BRUSH - Card Deck.

How Design Tools Facilitate Right-sizing Choices for First-time Homebuyers

	Form	Shape	Colour
Creative Wack Pack	Minor rounded corner (Rectangle -2-dimensional planes)	Rectangle, flip open tab (front Title- image) (Back Description) Side 1: A colorful whacky clown, configuration of lines and planes (including the same colors as the categories) Side 2: Unique for each card, black line drawing, image representing the subject matter on the card."	White background, black text. Each category has a color, GREEN, ORANGE, BLUE, RED... Creates rectangular Tetradic colour scheme (Primary hue, saturation and double complementary)
House Of Cards	Minor rounded corner (Rectangle -2-dimensional planes / assembled creating a -3-dimensional volume)	Rectangle, flip open tab (front + Back Title and background image) (Side x2 - small row of interior cards, examples) Side 1: White background with central gold starburst, , configuration of lines and planes Side 2: Unique for each card, object / item photographed, , configuration of lines and planes	White Background with gold starburst (monochromatic) & multicolored photographs (multiple hues, values, saturation and colour schemes)
Conscious Eating	Medium rounded corner (Square -2-dimensional planes)	Square, flip open top (front image + title) (back -text) (blue & green) Only one image / photograph on the cover, configuration of lines and planes On side A Cards: small non-objective shape (+ graphic)	Packaging -Background Image, White , light blue / green text. Cards (interior) 8 category, each with a unique color/ hues (Hot Pink, light orange, dark orange, light blue, bright blue, yellow, dark green, bright green) each card has text in a opposite color that is the main color on the back side of the card. (ex: Front: Hot Pink with orange text Back: Orange background with blue text) Combined, creates a rectangular Tetratic colour scheme
ID Cards	Minor rounded corner (Rectangle -2-dimensional planes)	Rectangle card stock (back & Front cover) , interior light paper (no other separate packaging) Only one graphical element on the cover with text., non-objective shape Multiple images and sketches on the interior package, configuration of lines and planes	Black, white, yellow, red, blue. (various combinations of primary colours, hue, value, intensity and creating a triatic colour scheme)
Art Rules (And How to Break Them)	90 degree corner (Rectangle -2-dimensional planes)	Rectangle hard cardboard box , opens like a book. Cover - Large modern art image of a surreal art work, configuration of lines and planes Each card on the front is composed of a single large image of a piece of work , configuration of lines and planes	Cover, A combination of white, black (text) with pops of color, Red, Blue, Yellow. Primary colour, triatic scheme. Interior cards , 7 categories, each with a different color (Pink - Yellow - Blue - Brown - Green - Black - Purple) tile block, rectangle colour blocking with photographs on reverse side.
Psycho Tests Analyze yourself (and your friends)	90 degree corner (Rectangle -2-dimensional planes)	Rectangle hard cardboard box - flip up (Top) to open. Cover - Central art image of a rendered person holding an activity card, configuration of lines and planes Each card on the front is composed of 2 blocks of color (referring to the category) with a black and white people line drawings , configuration of lines and planes	A combination of light grey, white, black (text) + colorful images. Interior cards , 3 categories, each with a different color (Lilac, moss green (complimentary colour scheme) and image of grey, white, red and yellow.)
Zen By the Brush	90 degree corner (Rectangle -2-dimensional planes)	Rectangle hard cardboard box - opens like a book. (Including a brush (organic and board, - rectangular) Cover - Central art image - brushed sketch of graphical elements, configuration of lines and planes. Each page is composed of one black brush line drawings , configuration of lines and planes	Cover, a combination of white, black (text) with pops of color, Red & green (hues). Complimentary colour scheme / high value & saturation of hue. Interior booklet , 3 different colors (light Yellow-Green - Red) with black sketched graphics.

Table 14. Decision-Making Visual Tool Characteristics – Form, Shape, Colour.

How Design Tools Facilitate Right-sizing Choices for First-time Homebuyers

	Texture	Light	Proportiton
Creative Wack Pack	Card Stock - smooth texture, patterns, visual texture + material depiction	General illumination of characteristics creating line and planes	Graphics: Side A: one large coloured graphical element (Wacky clown) with text (Title + author's name) Side B: one large black and white graphical element (sketch) on each card (dominant) with title, card number & text. Text: Side A: 2 types of fonts: author's name, top (medium scale) and title (top, centered) large (dominant) Side B: 2 types of fonts: title (top, centred) large / colourful (dominant), card number (medium), general text smaller (hierarchal order)
House Of Cards	Card stock, smooth texture with tactile slits , patterns, visual texture + material depiction (Photograph)	General illumination of characteristics creating line and planes	Graphics: Side A: one large graphical element (starburst) on each card (dominant), Side B: Unique for each card, object / item photographed. (No text on interior cards)Text: Packaging, 2 types of fonts: title (centered) large / black (dominant), designer's name text smaller/white
Conscious Eating	Card stock, smooth texture, text.	General illumination of characteristics creating line and planes	Graphics: Side A: top -large text (dominant) + small left hand side non-objective shape, Side B: no graphics, medium size text on bottom half of Packaging - one background photograph (dominant) with tile and text. Text: Packaging, 3 types of fonts: title (centered) medium/green, Slogan smaller in white
ID Cards	Smooth texture with tactile elements , patterns, visual texture + material depiction (Photograph/sketches)	General illumination of characteristics creating line and planes	Graphics: Side A: one central graphical element (photograph or sketch) on each card (dominant), top card number and title in medium bold, black font, small bottom text. Top / front deck: central title with non-objective shape graphic + small text / description bellow (Fold out map design - small scale and compact package) Text: Front packaging, same fonts x2 sizes : title (centered) large / black (dominant), designer's name, text smaller / white
Art Rules (And How to Break Them)	Smooth texture, patterns, visual texture + material depiction (Photographs)	General illumination of characteristics creating line and planes	Graphics: Packaging, central art work with blocks of primary colours with white text. Side A: composed of 4 sections: dominant - central block of small text, top -large title + small text (left) + large coloured circle with inserted white number card with category name in black (right), bottom large black arrow head with block of small text, image referencing. Side B: large central art work - photographed. Text: Packaging, all the same fonts: 4 sizes (all in white on coloured background)
Psycho Tests Analyze yourself (and your friends)	Smooth texture,(outline sketches)	General illumination of characteristics creating line and planes	Graphics: Packaging, central art work with large scale black text. Side A: medium scale -central block of small text, Side B: Unique hand drawn contour graphics - large scale for each card (No text on side B cards) Text: Packaging, all the same fonts: 3 sizes - large central title (in black)
Zen By the Brush	Smooth texture , patterns, visual texture, (paint sketches)	General illumination of characteristics creating line and planes	Graphics: Packaging, central art work (dominant) with top left hand colour block with title / text inside. Side A: medium scale text block - upper right + small colour block square with page number inside , bottom left corner (No images), Side B: Central -Unique sketched graphics - large scale for each card (No text on side B cards) Text: Packaging,2 types of fonts: 3 sizes - large title in coloured block rounded square (top left hand side)

Table 15. Decision-Making Visual Tool Characteristics – Texture, Light, Proportion.

How Design Tools Facilitate Right-sizing Choices for First-time Homebuyers

	Scale	Balance	Harmony & Unity
Creative Wack Pack	4.75"X3" (medium human scale) 64 cards - X 4 categories (16 per) - Explorer, Judge, Artist & warrior)	Packaging: asymmetrical arrangement Side A: asymmetrical arrangement (reflecting packaging) Side B: asymmetrical arrangement	Shape: Same scale, style (sketching) and placement of graphic Colour: Colour coded categories, whack clown graphic repetition, constant black line drawings Texture/ Material Details: Same style of rendering / texture application
House Of Cards	3.75" X 2.75" (small human scale) 54 cards - varied photographed images.	Packaging: symmetrical arrangement Side A: Radial arrangement (starburst) Side B: asymmetrical + symmetrical arrangement	Shape: Consistent scale, same starburst image on each card Colour: White and gold on each card - side A / interesting image on each side B - Texture/ Material Details: each card offers 6 cut out slots to create a 3D form
Conscious Eating	4.5" X 4.5" (medium human scale) 40 cards - 8 categories with 5 cards each.	Packaging: asymmetrical arrangement Side A: asymmetrical arrangement Side B: asymmetrical arrangement	Shape: Consistent scale, same placement of title and text creating blocks of information Colour: Colour coded categories, constant value and intensity in hues Texture/ Material Details: colour application, coordination of colour schemes
ID Cards	2.25" x 3.75 " (small human scale) 1 large fold out package, printed on both sides, each individual card / task pertains to a specific activity. (total 32 activity cards with central instructions, tips and directions.	Packaging: asymmetrical arrangement Side A: symmetrical arrangement Side B: symmetrical arrangement	Shape: closed - compact (all folds in together) Open consistent layout Colour: Use of primary colour linking to the different categories (colour coded) Texture/ Material Details: Top and bottom material constant - correct application to indicate function
Art Rules (And How to Break Them)	7" x 8.75" (large human scale) 42 illustrated cards with ideas and information and a 64 page book, Modern Art: Inside out. 7 categories, each with a different color.	Packaging: asymmetrical arrangement Side A: asymmetrical arrangement Side B: symmetrical arrangement	Shape: consistency in text layout and image scale and placement Colour: colour coded categories Texture/ Material Details: constant material application
Psycho Tests Analyze yourself (and your friends)	6" x 8.5" (large human scale) 22 illustrated cards. 3 categories, each with a different color.	Packaging: asymmetrical arrangement Side A: symmetrical arrangement Side B: symmetrical arrangement	Shape: same text and image distribution Colour: use of colour coded categories Texture/ Material Details: Same material application
Zen By the Brush	6.75" x 8.75" packaging - Book 5" X 7" (large human scale) A booklet with varied instruction, images to create a meditating mindset through painting, a brush to create the art on a painting board (water based)	Packaging: asymmetrical arrangement Side A: asymmetrical arrangement Side B: asymmetrical arrangement	Shape: consistency in text layout and image scale and placement Colour: consistent series Texture/ Material Details: constant layout and representation (Packaging + book cover)

Table 16. Decision-Making Visual Tool Characteristics –Scale, Balance,Harmony & Unity.

How Design Tools Facilitate Right-sizing Choices for First-time Homebuyers

	Variety	Rhythm	Emphasis
Creative Wack Pack	Size: varied font sizes. Shape: Mixture of text and graphic (on each card) Colour: Colorful whacky clown image, colour coded categories Details: colourful clown vs black rendering sketches	Repeating composition(side A &B) , repetition of font and graphical element in placement, colour coded categories, reflecting the text colour, dominant vertical elements directional placement.	Packaging: Wacky clown graphic Side A: Wacky clown graphic Side B: Central Black & White hand rendering / image
House Of Cards	Size: n/a Shape: varied configuration (side A (constant) vs side B unique images) Colour: Monochromatic - gold starburst Details: 6 cut out slots - 3D arrangement	Repeating composition(side A) , repetition of single image on each card (side B), consistency in slot cut out / placement, dominant horizontal elements directional placement of images.	Packaging: White Block with black lettering - Central title Side A: Central Starburst - Graphic Side B: one Image domination the entire card
Conscious Eating	Size: Different font sizes Shape: N/A Colour: Colour coded categories (no black and white) Details: Use of coordinating colour on text	Repetition of elements - consistent throughout, colour coded classifications Horizontal orientation,	Packaging: Background photograph SideA: Bright colour block with complimenting colour in text Side B: Colour block (using the complimentary colour from side A)
ID Cards	Size: 2 size - small folded up / larger open format (font variation) Shape: Various of text and graphic scale and configurations Colour: Black background with white text / colour coded categories Details: Map composition - top and bottom material more ridged, facilitates opening and closing	Repeating composition(side A &B) , repetition of font and graphical element in placement, colour coded for each category, dominant vertical elements directional placement.	Packaging: Central Tile + graphic Side A: Central graphic element (photograph, rendering or sketch) Side B: Central graphic element (photograph, rendering or sketch)
Art Rules (And How to Break Them)	Size: different text blocks and mixture of font sizes Shape: different emphasis / configurations (text blocks) Colour: Tone on tone colour blocks with coloured circle to identify the card number. Details: Unique art work on each card (side B)	Repeating composition(side A &B) , repetition of font and graphical element in placement, colour coded for each category, dominant vertical elements directional placement.	Packaging: Central image Side A: Coloured circle containing the card number (only colour on the card) Side B: Central graphical element (Photograph of art work)
Psycho Tests Analyze yourself (and your friends)	Size: Different font size (caps vs lower case lettering) Shape: N/A Colour: Colour coded categories Details: N/A	Repetition of elements - consistent throughout Text side / graphic side, colour coded classifications Horizontal orientation,	Packaging: Overall dominant graphic image Side A: Central Text (only item on the page) Side B: Graphic composition (overall)
Zen By the Brush	Size: Different font size Shape: unique graphics on each page Colour: Use of red lettering for authors name Details: N/A	Repeating composition, quote + author in red font (side A) , repetition of placement and amount -single varied images on each card (side B), Repetition of colour content, dominant horizontal elements.	Packaging: Blocked text title Side A: Text - directives Side B: Sole graphic

Table 17. Decision-Making Visual Tool Characteristics – Variety, Rhythm, Emphasis.

Existing Creative / Decision-Making Tool Analysis

1. FORM: Two-dimensional plane.
2. SHAPE: Small to medium human scale format, rectangular with rounded contour. Graphical referencing with natural and non-objective shapes.
3. COLOUR: White background, black text, high value and intensity of hues (bright / pure colours). Colour coded categories.
4. TEXTURE: Smooth tactile feel with visual graphical material depiction or pattern.
5. LIGHT: General illumination creating lines and planes.
6. PROPORTION: Varied text proportion with dominant graphical element.
7. SCALE: Medium human scale (graphics often depict the larger scale item on the card)
8. BALANCE: General asymmetrical arrangement.
9. HARMONY & UNITY: Consistency in card format, colour coded categories, similar details and characteristics throughout deck.
10. VARIETY: Different font styles and font size, colour coded categories, varied image (s) on each card.
11. RYTHYM: Repetition of elements (text & graphics) - consistent throughout, colour coded classifications, horizontal orientation.
12. EMPHASIS: Larger title, dominant graphic, colour blocking.

Table18. Existing Creative/ Decision-Making Tool Summary.

4.4 Decision-making Design and Prototype Creation

The findings from the interviews with both groups, the real estate agents and recent homeowners, combined with the results from the researcher's analysis of the existing decision-making tools drove the creation of the various visual elements, composition and information of the card-based prototypes.

In combination with the literature review, the information gathered in the interviews highlighted the areas and key codes to form categories. The central elements featured in the interviews reflected; 1) first-time home seekers were unprepared for the detailed elements or implications regardless of the previous research accomplished, 2) people needed help in assessing the real estate market

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and the lifestyle implications of various options/ selections. 3) novice homebuyers want confirmation of previously acquired information, need direction during the process, and sought advice from trustworthy professionals, 4) individuals wanted more centralized information resources; the information is available yet scattered and individuals are not sure if they got it all or what applies to them. These concerns and themes emerged into the four main themes which are: 1) Get Ready, 2) Tips & Hints, 3) Key Players, and 4) Resources.

The leading visual characteristics (elements and principles of design) included in the final prototype were adopted from the previously evaluated dominant elements of the existing decision-making resources. These visual characteristics are included in Table 18.

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Element & Principles	Composition of the Prep Deck Prototype
Form	Two-dimensional plane
Shape	Rounded contour edges Geometric square outline (medium human scale) Non-objective shape – house graphic
Colour	White background, black text Colour group structure (blue, pink, green & purple) High saturation of hues
Texture	Smooth tactile touch
Light	General illumination creating lines and planes
Proportion	Varied font sizes Dominant: graphic (house) – Side B / block text –Side A
Scale	Medium human scale (4.5” X 4.5”)
Balance	Symmetrical – Side A (central Text) Asymmetrical – Cover / Side B (Graphic – house (lower right))
Harmony & Unity	Consistency in shape, colour (coded by category), texture and detailed graphics
Variety	Assortment in colour / coded categories, grouping of blue, green, pink, purple
Rhythm	Repetition in form, text placement, graphic and composition Leading horizontal arrangement
Emphasis	Dominant text / title, graphic (house), colour coded categories, central block of text central

Table 19. ‘Prep Deck’ Visual Characteristics.

The accumulated information, the intended purpose of the design tool, and the card-based format were combined into the home buying preparation kit, christened, ‘THE PREP DECK’ A Home Buying Preparation Kit (see Figure 21).

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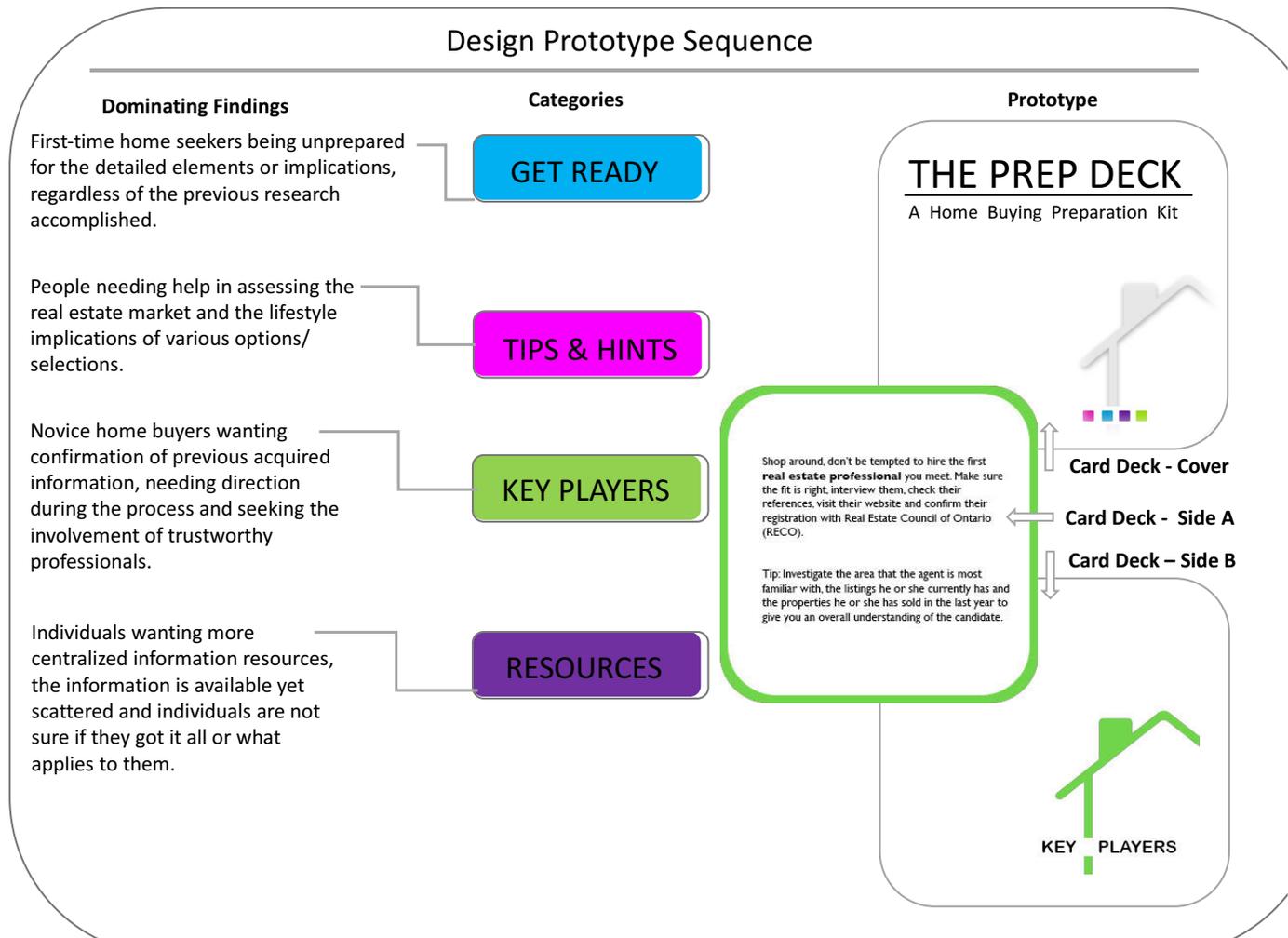


Figure 21. Design Prototype Sequencing.

4.5. First-Time Home Seekers Response to Prototype Testing

The findings from the 'Prep Deck' prototype usability testing were sorted into the following categories: 1) themes, 2) use, 3) format, 4) sequencing, 5) design, and 6) purpose, which are summarized in Table 20.

Themes

The dominant themes featured: gaining information, acquiring tools to inform decisions, having a tangible direction and resources, considering other possibilities,

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prompting exploration, evaluating needs, learning new detailed information, and gaining knowledge in a fun way. Users also valued: A checklist of things to consider, accomplish or research further, a road map of what to reflect upon when buying a home, a collection of resources about the process, tools to evaluate lifestyle needs & choices, a confidence booster and a guide to understand implications. They found it to be a good starting point and a good organizational tool to evaluate needs and prepare oneself, and to familiarize oneself with industry terms.

Uses

The main uses for the card-based toolkit included: a good starting point, offering directions, playing and having a discussion with a partner that would lead to more research. Users could see using it as a check point, a step-by-step preparation guide, to create a list and accomplish each task by going through each card in order to start the research and process. They positioned it as a getting ready tool, before meeting the agent, initiating discussion and direction with their partner, and as a validation of previous or future research.

Format

As a result of the 'Prep Deck' testing, the majority favored physical card-based media over a digital format. The participants were not presented a digital version of the 'Prep Deck' but when asked, four out of seven candidates preferred the physical cards and indicated that the tangible cards are more interactive and tactile, easier to follow, to re-organize and share, fun and relaxed since it evokes a board game structure. They also added that the digital format would in principle be effective, but would feel too much like a task / homework, take the fun out of it, and be less successful when trying to create a conversation with a partner. One participant indicated that having the option of

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a physical card-based tool and a digital tool would benefit different types of actions and scenarios and she would use both. The two remaining candidates indicated that a digital version would be more familiar and easier to access, save, and share information and cards would be too bulky.

Sequencing

The usability testing showed that, unanimously, the candidates would choose a category and go through all the cards in one theme before moving on to the next one. Six out of the eight participants indicated that the 'Get Ready' category is their logical first choice as it offers a good foundation of information, which is important before doing the assessment of individual needs. The 'Tips & Hints' and the "Key Players' seem to be interchangeable with five of the participants in terms of order, since both offer additional information. The 'Resources' category ranked last with six of the participants as it offers additional tools to research and further the inquiry and preparation.

Design

Collectively the design was regarded and valued for its scale, form and application of colour coded categories making the process organized and easy to comprehend. All participants offered positive comments on the design's clean aesthetics, professional presentation, good use of space, simple graphic composition and bright colors with only two candidates wishing it had less white space and different graphics (more artistic) on each card. The individual physical cards were viewed positively by six out of the eight participants as they gave freedom to explore and arrange the cards, with only two individuals wanting a digital version. Four participants mentioned the effect of the bold text as it drew attention to the subject of the card and

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the title 'Prep Deck' was commented by one individual on as playful yet direct. A few suggestions for improvement included: having less white space, showcasing different or more arty graphics on each card to make it more interesting and numbering each card and referencing them to other cards within a theme or sequence. Only one person recommended adding instructions and one person suggested adding a terminology section, to be placed on the reverse side of the 'Prep Deck' cover. All but one candidate saw no need for instructions, as the cards were self-explanatory and exploratory.

Purpose

All individuals indicated that the card-based toolkit could provide a good start for general information for first-time homebuyers, so the purpose was clearly communicated. It could be used to create a checklist of things to prepare or evaluate when thinking of buying a home, add value, a sense of direction, security and confidence when embarking on a home purchasing journey. Also, four participants indicated that it could act as starting point with categories to help group things, help navigate the process and help create a non-confrontational conversation with a partner. Furthermore, gathering essential information in one tool / place, could ensure that all the information is covered and provide other aids to direct a home buyer's search and research.

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Summary of prototype testing					
Themes	Uses	Format	Sequencing	Design	Purpose
<ul style="list-style-type: none"> Information Prompts / checklist Clarification Needs assessment Confidence Guide / facilitate process Research phase Understanding the elements /implications Collection of resources Industry terminology acquisition 	<ul style="list-style-type: none"> Direction Preparation Added knowledge Task accomplishment Starting Point Step-by-step 	<ul style="list-style-type: none"> Digital format (2 people) Card format (4 people) Card & Digital Format (1 person) 	<ul style="list-style-type: none"> Get Ready, Tips and Hints, Key Players, Resources (1 person) Get Ready, Key Player, Tips and Hints, Resources (4 people) Tips & Hints, Get Ready, Key Players, Resources (1 person) Get ready, Key Players, Resources, Tips & Hints (1 person) Resources, Key Players, Tips & Hints, Get Ready (1 person) 	<ul style="list-style-type: none"> Fun/professional design Fun/game like Tactile Categories (Colour coded) Graphic elements Bold text / subject More artsy / varied graphics / less white space No instructions needed 	<ul style="list-style-type: none"> Added value, sense of direction, security Knowledge acquisition Grouping information General information Preparation Categories Further research and resources

Table 20. Summary of Prototype Testing.

4.6 Summary

The summary of the key findings includes:

1. All real estate agents are resources themselves. They offer guidance, clarifications, tools and direct clients to other industry professionals to aid them in their home buying endeavour.
2. All novice homebuyers interviewed in this study pursue the involvement of trustworthy professionals when they are serious about purchasing a home and have done a basic analysis of their parameters mostly including: financial, area, home criteria and wish list. They are seeking confirmation of previous acquired information, added knowledge and direction during the process.
3. All first-time home seekers accomplish basic preparation by utilizing on-line tools to initially research their options and determine their direction.

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4. All first-time home hunters are unprepared for the detailed elements or implications of the home buying process and financial implications, regardless of the previous research accomplished.
5. All real estate agents indicated that, generally, individuals purchasing their first home are unrealistic and need help assessing the real estate market and the lifestyle implications of various options/ selections. Re-evaluation of criteria or compromising is part of the process.
6. Financial and lifestyle implications are revealed as the main factors in home selection for all first-time homebuyers.
7. The creation of a decision-making tool consciously applying the valued elements and principles of design seemed to be effective in delivering the information. These characteristics included; a two-dimensional plane, medium human scale format with rectangular with rounded contour, graphical referencing a non-objective shapes (house), white background, black text with high value and intensity of hues (bright / pure colours) creating colour coded categories. An asymmetrical arrangement with varied text proportion with dominant graphical elements yet keeping a consistent card format and characteristics throughout the horizontal oriented deck to complete the composition.
8. All individuals wanted more centralized information resources, and found that scattered information left them wondering if its complete and/or what applies to them.
9. The response (six out of eight participants) to the physical media of the card-based toolkit was generally positive. It is a tangible touch point to guide and facilitate the process, acquire and group information prompt discussion, initiate

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collaboration and promote information sharing and task accomplishments. Only two individuals voiced a desire for a digital format to facilitate the preparation and tasks associated with home purchasing.

10. One individual felt that instructions were needed and one participant suggested a lexicon of industry terms and reference numbers on the cards would benefit the 'Prep Deck'.

In the next chapters these concepts and topics are further developed and synthesized into design recommendations and theory.

Chapter 5. Discussion

This chapter presents synthesized information gained from the literature review, generally confirming the data findings gathered from the mixed methods used in this study. It reveals insights into the real estate market, the right-sizing movement, the characteristics and issues of the first-time homebuyers, and the decision-making process and tools, including potential refinements. This culminates in answering the central question, how can decision-making tools help facilitate first-time homebuyers in right-sizing their home as well as address the limitations of the study?

5.1 Insights into the Real Estate Market and First-Time Homebuyers

Insights into the real estate market and the first-time homebuyers were mostly derived from the data collected in methods one and two, interviews with real estate agents and recent home owners with some revelations gathered from method five,

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usability testing with home seekers (see chapter 3, sections 3.1, 3.2 & 3.7). The combined information answers the following sub-questions:

What does this study contribute to our understanding of the real estate market?

What is significant about and important to the first-time homebuyer?

5.1 A. The Significance of the Real Estate Market

Even though home occupancy has declined in the past forty years, the size of homes has increased considerably, and larger homes cost more to purchase, operate, and maintain. A property represents people's largest monetary investment, and in turn greatly impacts people's lives (City Planning, 2015; Rabidoux, 2012; Thalmann, 2003). The ratio of housing cost to income is disproportionate, meaning that Canadians are allocating a large portion of their overall capital to own a residence (BMO Wealth Institute, 2015). This is reflected in the interview findings, which denote that individuals understand that purchasing a home represents not only a sizable financial implication, but will have an important effect on their lives, and so don't enter homeownership lightly. Further echoed in the interview and the usability testing findings, is that one of the primary concerns of first-time homebuyers is affordability, and many don't want to over-extend their housing budget in order to have a comfortable and/or maintain an established lifestyle. Findings from the interviews with the real estate agents also highlighted an interesting recent trend (five to seven years) that can be somewhat attributed to the disproportionate ratio of housing cost and income. More and more, first-time homebuyers are getting financial help from loved ones, in order to get into the

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housing market sooner rather than later. This also suggests that first-time home buyers need to either wait longer to enter the real estate market, since they need to save up for a down payment and associated cost when buying a home, or accept financial assistance from loved ones to expedite the pursuit. This could be attributed to the larger size of homes, which reflects a higher price point hence, thus, needing a higher amount for a down payment.

As a reaction to the larger scale housing and higher prices, smaller physical homes and fewer occupant households have been transforming the housing market in the last decade. This trend is projected to continue as the average size of households will continue to decline for most lodging types, influenced by the demographic of the population, resulting in different housing choices made by people (Housing Trend, 2015). As the interview findings show, homebuyers are willing to consider properties of various sizes in order to ensure affordability and lifestyle attachments. First-time homebuyers are concerned about choosing the right property, one that aligns with their budget, needs, wants, values and lifestyle choices. This is where the literature introduces the right-sizing movement, and defines it as making a home fit an individual's or a family's lifestyle and needs by maximizing usable space, and offers an opportunity to liberate people from bigger household demands (Tom, 2014; Suzanka, 2015).

Right-sizing embodies a wide range of elements and barriers that are beyond the physical space within a home. Some of the more common barriers identified in the literature and the findings include the challenges of: 1) avoiding confusion while looking for and finding an alternative housing model in contemporary consumer culture,

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2) inability to recognize and measure quality over quantity in both lifestyle choices and physical spaces, 3) creating a set of personalized living choices that address options such as environmental drivers, affordability (short vs long term), commuting constraints, location, and amenities given the varied values and opinions of different family members, 4) envision simplifying one's surroundings by reducing one's possessions, and 5) making the right decisions that will fit an individual and/or a family's needs, given multiple scenarios and options (Featherstone, 1987; Suzanka, 2015; Ware, 2007).

Right-size living is the creation of a set of unique and personalized living choices, but as the interview findings and the usability testing reveal, individuals are not aware of what right-sizing is and how to incorporate its principles in a home search. Right-sizing is something people seem to strive to achieve, yet, they don't have the knowledge or the vocabulary to articulate it. This is where a decision-making home preparation tool could not only expose and teach individuals about right-sizing, but help in assessing their personal criteria through a design intervention.

5.1 B The Significance of First-Time Homebuyers

Millennials (individuals born between 1980 and 1995) are the largest segment of the first-time buyer market and have an important influence on housing demand as well as on housing choices (National Association of Realtors, 2015; Barriosa et al., 2013). The age of the home seeker seems to play an important role in the timing of household formation and can impact housing decisions (Barriosa & al, 2013). This was demonstrated in the interviews and in the usability testing, featuring mostly singles or

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couples with no kids, ranging in age from mid-twenties to mid-thirties, embarking on a transition phase of their lives. This new stage of their lives included: coupling, a growing family, gaining full time employment, shifting to adulthood or wanting to make an investment in their future. This is a stage of their lives where, first-time homebuyers are more financially stable and have the means to obtain a home as well as a desire to achieve one of life's aspiration, home ownership (Glenworth Canada, 2016; Barriosa & al, 2013).

The literature shows and is confirmed by the interview findings, that the current first-time homebuyer seeks two types of property categories: a turnkey home that needs little or no work, which represents the majority of homebuyers; or an investment property to add a personal stamp to and add value for the future (Estrin, 2016). As revealed in the real-estate interview findings, this segment of buyers thinks differently than the previous generations. Homebuyers initially want it all, the physical structure that meets all their needs and wants, the desired location, the move-in ready dwelling and all at the lower-end of their budget to uphold their lifestyle. Yet, they are mostly unrealistic about the realities of the real estate market. As those realities are fully revealed, there is a need to compromise, reassess and readjust priorities in order to move forward in their property search. The interviews also indicated that second to affordability, lifestyle choices override dwelling structure. This disclosure implies that first-time homebuyers are prepared to either forgo a bigger home, a more expensive home or a more polished property to maintain a certain lifestyle, which re-enforces the need to guide them into right-sizing. First-time home owners also view their dwelling as a starter home which they intend to reside in for an average of five years. This indicates

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a necessity to prioritize their decisions and reinforces the need for a decision-making tool. A home preparation kit could further explore right-sizing goals and could potentially lead to more realistic expectations, build self-confidence, simplify the house hunting process and avoid future moving costs and frustrations as homeowners are more likely to reside in their home longer if the physical setting fits their needs and lifestyle.

The interview findings further show that most of this segment of first-time homebuyers are pro-active in research during the initial preparation phase. The issues seemed to be that the research conducted only provides a broad knowledge of the dominant elements of the home purchasing venture such as: financial aspects, location and home criteria, but the details of those elements and other implications are missed. This is in part attributed to the existing industry knowledge and resources being scattered on different platforms. The interview findings reveal that first-time homebuyers are not only overwhelmed by the volume of potential information, but also don't know what is applicable to them, therefore, often miss crucial components. This could result in missed opportunities and oversights. The primary conclusion is that first-time homebuyers have shown that they are willing and able to do the research in the preparation phase of home purchasing. This is followed by the insight that the amount of information and resources are scattered and leave first-time homebuyers overwhelmed, frustrated and unprepared, thus making an informed decision difficult. Therefore, this suggests that there is a need for a design intervention to create a central platform to access information, merge industry knowledge, feature right-sizing considerations, and help structure a decision-making process. The tool can help make the information more manageable for decision-making by making sense of the pattern of

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information in a practical way. The goal is to achieve message and information clarity to address the feeling of being overwhelmed and unprepared when faced with a decision.

Decision is resolution reached after consideration, and yet individuals want to put in the least amount of effort when making a decision (Decision, n.d; Shah & Oppenheimer, 2008). As a result, a decision-making tool and framework can help homebuyers to reduce the effort required in making a decision and facilitate the assessment of options, criteria and help make informed decisions (Shah & Oppenheimer, 2008; Bouyssou et al., 2009).

In addition, the development of a decision-making tool could add value to first-time homebuyers, since it not only groups industry knowledge and collects resources, but it can also offer a sense of direction to aid in assessing first-time homebuyers' needs and lifestyle direction, corresponding to right-sizing.

The interview findings further denote that home hunters realize the added value and involvement of industry professionals yet, mostly seek them (mainly a real estate agent), only after that initial research phase, to confirm the gathered research discoveries, elaborate on those discoveries and/or help them with the process. This indicates that a design intervention is needed as a self-directed preparation tool. The tool can be used to prompt areas of research and right-sizing assessment to form a broad perspective prior to the home search, as well as direct them sooner to industry professionals. This independent preparation phase can arm first-time homebuyers with knowledge and resources, help them evaluate personal perimeters, reduce the home search time, clarify issues, facilitate the relationship with industry professionals, solidify

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a direction and elevate the level of focus and confidence throughout the home buying process.

The information from the literature, the interviews and usability testing gathered to address what is significant about the real estate market and the first-time homebuyers to reveal important insights. This in turn informed the next phase in the study: the content, the media, the formal qualities, and its testing results.

5.2 Insights into the Decision-Making Process and Tool

Insights into the decision-making process and tools were mostly deduced from the data collected in methods three, the comparative evaluation of existing creative tools, the decision-making tools and resources, method four, the prototype development and method five usability testing (see chapter 3, section 3.4, 3.5, 3.6 & 3.7). The combined material answers the following sub-questions:

What are the decision-making resources and tools accessible for first-time homebuyers?

What are the characteristics of existing decision-making tools and how can they offer insightful information for a set of design guidelines for designing a home preparation kit?

What kind of guidelines would contribute to a useful design for a decision-making card deck?

How can design facilitate and engage home seekers to utilize a decision-making tool in their home preparation search?

5.2 A. Types of Card-Based Decision-Making Tools on the Market

Varied resources are available to first-time homebuyers prior to purchasing a home, including on-line tools, physical based guides and personalized services to aid in the knowledge acquisition. This is revealed in the findings from the interviews with the real estate agents and the first-time home seekers. The digital tools mainly include, on-line property and neighborhood searches, on-line mortgage and household budget calculators, on-line mortgage pre-approval form financial institutions and general inquiries on on-line home buying forums and/or professional resource web-sites. The physical based tools generally include handouts with general information from the real estate agents regarding home buying process, as well as various paperwork examples of worksheets and information about financial implications and property viewings. Homebuyers obtain personalized services from industry professionals, often starting with the real estate agent, who offers support and directs to other professionals, such as lawyers, inspectors, financial brokers, etc. All these professionals are considered sources of guidance and knowledge.

Design media can be found in digital and physical formats, often complimenting each other, with both offering advantages and disadvantages. Furthermore, they equally have the potential to transfer information, yet physical media can provide supplementary properties such as touch, feel, weigh (Agrawal, 2010; Kirhor & Ritesh, 2013; Fodor et al., 2013). The card-based physical media choice offers a tactile artifact that is simple, tangible, easy to manipulate, and provides a suitable touchpoint for rapid prototyping and testing. It further offers a medium to engage users, contributing to a collaborative effort by providing a communication tool and encouraging the advancement of the

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process, making it less abstract and more concrete (Wolfel & Merritt, 2013; IDEO, 2011). By structuring the problem, creating an appropriate framework and designing a viable tool, it allows users to assist in communication, to facilitate knowledge transfer, and to engage in collaborative efforts (Bouyssou et al., 2009; Watzlawick, 1974). Even though not a certainty, a framework can offer a method to gain information in order to analyze suitable alternatives leading to a potential solution (Bouyssou et al., 2009). A framework featuring tangible cards or method cards as a touchpoint makes the process more visible, more accessible as well as easier to browse, sort, and share. The organization of method cards into leading categories within the subject matter makes the themes easy to reference and creates a focus on a subject (Wolfel & Merritt; 2013, IDEO, 2003).

The findings from the existing decision-making tools comparison in method three, revealed that most of the evaluated card-based tools featured categories, which grouped related information to reveal themes within their assembly. The groupings of information into categories organized the content and facilitated the direction of the tool by referencing the broad subjects. The premise of the tactile resources offered a visible platform to communicate and/or explore various aspect of a subject.

In addition, the findings from usability testing disclosed that the familiarity of cards made the tool more approachable, as it had a game-like appeal, thus making the home buying preparation more fun and less daunting. The card-based artifact was also viewed as a centralized platform for industry resources, which offers a self-directed and customizable tool to gather knowledge and access more in-depth research. Individuals

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saw the tool as a starting point in their home buying preparation, a guide providing a plan of action, and a series of prompts to point them in the right direction.

This indicates that, a home buying preparation card-based toolkit needs to present a fun, interactive, customizable and flexible platform. The organization of the tool into logical categories can make the information more identifiable and manageable, thus making the home buying process less overwhelming. Furthermore, forming categories like: Get Ready, Tips & Hints, Key Players and Resources, established from the content can provide concentrated knowledge and focus a first-time homebuyer into action. By featuring an organized framework, a card-based tool offers a supportive platform and direction to guide first-time homebuyers in exploring suitable choices and to help make informed decisions.

5.2 B. Type of Guidelines in Information Design & Card-Based Design

Various methods can be used to structure a card-based decision-making tool. Many method cards present the same features and formal qualities yet, guiding principles and limitations must be considered to choose a suitable approach for the design. The literature features a method landscape and design dimensions to consider including 1) purpose and scope, 2) duration of use and placement in the process, 3) system or methodology used, 4) customization and 5) formal qualities as approaches used (Wolfel & Merrit, 2013).

The findings from the comparative analysis of the existing decision-making resources in method three revealed the following dominant features, as addressed in the literature. The purpose and scope offered all three roles: 1) general inspiration

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promoting lateral thinking and problem solving, 2) participatory, understanding and empathy for the content and engages users in the process 3) context specific/agenda, focusing on content to target a user or a subject. The duration and placement in the process were emphasized by the oblique cards regarded as the anywhere/anytime cards and the method cards used as needed, providing various techniques. The system or methodology featured basic suggestions and offered simple directives, yet no specific rules, and the specific instruction cards defining commands. The customization referenced the trivial form as being fixed and unchanged, but permitting re-structuring. The formal qualities are the combined approaches joining text and images or illustrations (see Figure 22).

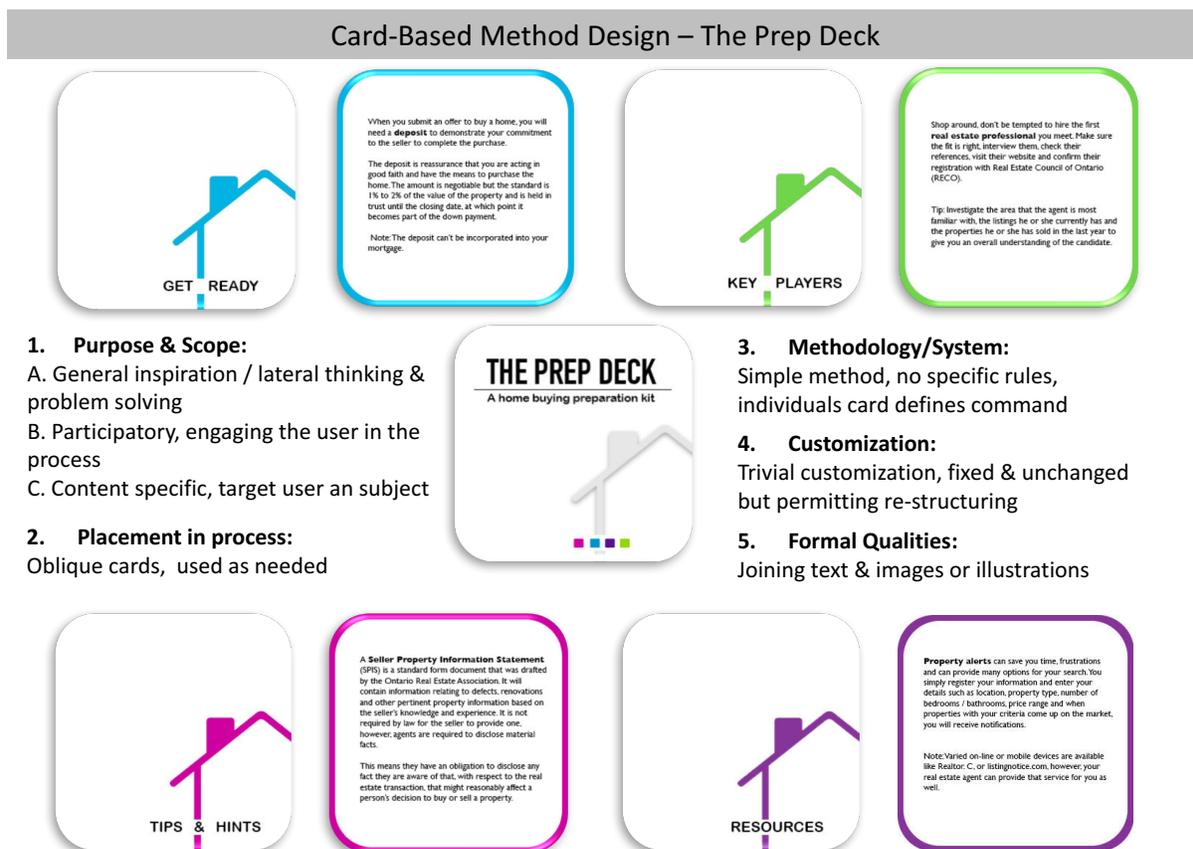


Figure 22. Card-Based Method Design – The Prep Deck.

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It is not only important to consider the dimensions of the card-based tool, but researchers must be aware of the presentation of information to enhance the artifact. Visual appeal engages, attracts and entices individuals to explore the content and is perceived as easier to use, has a higher probability of being used and promotes creative thinking and problem solving (Heer, 2013; Lankow et al. 2012; Lindwell et al., 2010). Information design is a communication vehicle, which presents data visually. It relies on key principles to successfully relay information that engages an audience and quickly transfers knowledge. To communicate a message, information design looks at key criteria to create a captivating platform such as A) the priority of application (appeal, comprehension and retention), B) the effective elements (unity, soundness and beauty) and C) the unity of good information design (interestingness, integrity, form and function) (Lankow et al. 2012; McCandless, 2012).

The findings from the comparative analysis of the existing decision-making resources in method three revealed that the priority of application in information design strongly featured appeal as the dominant element, followed by comprehension and retention. The effective elements of information design discovered that beauty prevailed over soundness, followed by unity. The overall good information design offered interestingness as its leading feature, followed by integrity/function and form (See Figure 23). This was confirmed in the usability testing as most the participants offered positive feedback on the eye catching design, colour coded categories and the simple and manageable messaging in the text to understand the subject matter.

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Information Design Dominant Elements – The Prep Deck

- **INFORMATION DESIGN**
- **Priority of application:**
 - Appeal
 - Comprehension
 - Retention
- **Effective elements:**
 - Beauty
 - Soundness
 - Unity
- **Overall good design:**
 - Interestingness
 - Integrity / Function
 - Form

When you submit an offer to buy a home, you will need a deposit to demonstrate your commitment to the seller to complete the purchase.

The deposit is reassurance that you are acting in good faith and have the means to purchase the home. The amount is negotiable but the standard is 1% to 2% of the value of the property and is held in trust until the closing date, at which point it becomes part of the down payment.

Note: The deposit can't be incorporated into your mortgage.

Shop around, don't be tempted to hire the first real estate professional you meet. Make sure the fit is right, interview them, check their references, visit their website and confirm their registration with Real Estate Council of Ontario (RECO).

Tip: Investigate the area that the agent is most familiar with, the listings he or she currently has and the properties he or she has sold in the last year to give you an overall understanding of the candidate.

Property alerts can save you time, frustrations and can provide many options for your search. You simply register your information and enter your details such as location, property type, number of bedrooms / bathrooms, price range and when properties with your criteria come up on the market, you will receive notifications.

Note: Varied on-line or mobile devices are available like Realtor. C, or listingtrac.com, however your real estate agent can provide that service for you as well.

A Seller Property Information Statement (SPIS) is a standard form document that was drafted by the Ontario Real Estate Association. It will contain information relating to defects, renovations and other pertinent property information based on the seller's knowledge and experience. It is not required by law for the seller to provide one, however agents are required to disclose material facts.

This means they have an obligation to disclose any fact they are aware of that, with respect to the real estate transaction, that might reasonably affect a person's decision to buy or sell a property.

Figure 23. Information Design Dominant Elements – The Prep Deck.

This suggests that a card-based decision-making tool needs to effectively engage first-time homebuyers by creating an appealing, interesting and beautifully presented package to capture their attention. This is vital to entice content exploration and to engage first-time home seekers into utilizing the tool, in order to facilitate right-sizing considerations. Additionally, it indicates that the content needs to have relevant information relating to the subject matter to offer integrity and soundness. This could assist comprehension of the subject to make informed decisions. Furthermore, it signifies that ensuring a unified composition in an organized form facilitates the retention of information to ease the overall process.

5.2 C. Factors Defining and Presenting the Design

When planning a design, considering and incorporating basic elements and principles of design is a good foundation (Decision, n.d.; Ching, 1987). The aesthetic quality of the design is based on the selection of visual characteristics featured in the design. This forms a person's visual perception of the composition. Ching's visual characteristics include: form, shape, colour, texture, light, proportion, scale, balance, harmony / unity, variety, rhythm, and emphasis (1987). Formal qualities are not limited to the basic elements and principles of design, but also include considerations such as one or two- sided, type of paper, size, multiple copies, graphics and text, to add to a beautifully presented visual design (Wolfel & Merrit, 2013).

The findings from the comparative analysis of the card-based tools in method three exposed the dominant elements and principles of design featuring:

- 1) two-dimensional form,
- 2) small to medium human scale presentation incorporating natural and non-objective figures, dominantly rectangular, with rounded edges in shape,
- 3) white background with black text and segments of high value hue, bright and pure in colour,
- 4) smooth tactile feel with graphical material depiction or visual pattern in texture,
- 5) general illumination revealing lines and patterns in light,
- 6) varied text and dominant graphical elements in proportion,
- 7) varied text with larger graphic illustrations, on a small to medium human scale,

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8) asymmetrical in balance,

9) consistency in card format and colour coded categories, yet varied images on each card in harmony and unity,

10) different font style and size in multiple colour coded categories featuring variety with diverse images and graphics,

11) repetition of elements (text, graphics and colour palette) consistent throughout and horizontal orientation in rhythm, and

12) large title, dominant graphic and colour blocking in emphasis.

Designers need periods of reflection and ideation to brainstorm potential ideas in order to transmit the gathered research into a tangible realization (Kolko, 2010; IDEO, 2011; Martin & Hanington, 2012). The purpose is to discover patterns through exploration, interpret the findings and develop a prototype for users to relate to the artifact. The prototype serves as a tool to gain feedback in order to improve the design for advancement (Milton & Rodgers, 2013; IDEO, 2011).

The results from the prototype creation in method four, featured the dominating visual characteristics of the elements and principles of design and of the leading information design criteria, incorporated into a rapid prototype. The final prototype includes four main categories (Get Ready, Tips & Hints, Key Players and Resources) within medium scale cards, including a simple house graphic, a white background with black text, featuring colour coded (bright hues) categories and varied font size and text (see Figure 24).

Dominating Visual Characteristics – The Prep Deck Prototype



Figure 24. Dominant Visual Characteristics – The Prep Deck Prototype.

The prototype, entitled the 'Prep Deck', a home buying preparation kit, offers five of the most pertinent topics within the four categories. This results in twenty cards to either inform users, ask probing lifestyle questions or incite an important action to take. The prototype is not a comprehensive card deck, but scaled to offer a manageable testing platform in the study.

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The creation of the prototype exposed the dominating findings leading to the categories. The 'Get Ready' category offers pertinent information, important action to take and lifestyle assessment in order to be better prepared, since previous findings revealed that first-time home buyers are unprepared regardless of their best effort. The 'Get Ready' category can guide them by directing areas of research and action. The 'Tips & Hints' category offers help in assessing the real estate market, evaluating various household options and considering lifestyle implications. The former findings discovered that fist-time homebuyers are concerned about making the right choice. The 'Tips & Hints' category can also direct them into more thoughtful considerations to guide their decision by offering advice or reflective questions. The 'Key Players' highlights the industry professionals who can aid in the house purchasing process.

In the earlier findings, we learned that first-time homebuyers seek professionals for direction and confirmation after their initial research. The 'Tips & Hints' category can help direct them toward the right professional and arm them with more accurate knowledge regarding the role that professionals can play in their home search. The 'Resources' category can support the discovery of other specialized tools and instruments to facilitate the assembly of information and lifestyle evaluation. The previous findings discovered that first-time homebuyers are overwhelmed with the volume of material, the complexity of the information and question that is applicable to them. The 'Resources' category can centralize material, and direct users to additional platforms to research a specific topic in order to gain more in-depth knowledge.

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This implies that decision-making tools need to feature a beautifully packaged composition to attract the first-time homebuyers but also benefits from an organized and manageable content through categories formation. This can lead to message clarity, practicality and stimulate the use of the tool. Within the visual composition, the leading criteria, features and structure must be combined to create a viable prototype. A rapid prototype leading to usability testing reflects the validity of those criteria as well as point out areas of refinement to enhance the decision-making tool for first-time homebuyers.

5.2 D. Usability Testing and Refinements

A research through design approach reveals that the intent is to discover, interpret and develop an appropriate platform to relate to the world (Milton & Rodgers, 2013). The objective is to focus on one direction by developing and refining it further, in order to obtain an applicable platform/artifact to explore. By narrowing down criteria and values to formulate a tangible realization, a prototype, the tangible artifact is central in testing the concept with potential users (Martin & Hanington, 2012). Usability testing is essential in getting feedback and gaining knowledge from the users (IDEO, 2011). People are facilitators in the creation of solutions (IDEO, N.D.).

The goals of the Prep Deck are to facilitate the home buying process and offer a platform to expose first-time home buyers to right-sizing. The goals as well as the barriers are highlighted in the findings from the usability testing. These reveal that first-time home seekers found the 'Prep Deck' to be a starting point in their home buying preparation, a support tool offering an overview, a guide and a collection of resources of elements to either consider, be prepared for or realize in a home search.

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Additional tools gathered information in a central location to gain industry knowledge, learn new detailed information, evaluate lifestyle needs and choices, and provide an understanding of the implications. It armed first-time homebuyers with knowledge, offered a sense of direction, reassurance and added confidence when embarking on the home purchasing journey. Additional findings highlighted the card-based physical media as a more interactive and tactile platform, easy to use, to re-organize and share. It was considered to be a fun tool that evokes a board game structure and promoted communication with a partner and the professional team. A digital platform, even though not presented (only inquired about), was viewed as a more rigid environment that would feel more like homework and would take the fun out of it, be less collaborative and less successful in creating a conversation with a partner. On the other hand, it could be a complimentary platform that would be easy to access, save, and share information, much less bulky than cards and cater to a wider population. Even though the Prep Deck offers a decision-making platform by gathering industry knowledge and prompting personal criteria assessment, it doesn't guarantee an informed or good decision as its result.

The findings further revealed that the medium scale format, simple presentation and graphic distribution presented a good overall visual package. The bright colour coded categories added to the appeal and organized the content in a manageable way, making it easy to reference. The bold text facilitated the understanding of the card's topic and the title of the tool, 'Prep Deck' was perceived as playful, yet clear. The majority saw no need for instructions, as the cards were self-explanatory and exploratory, but could benefit from a terminology section to clarify terms as well as

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reference numbers to link related subjects. The usability testing findings showed that the 'Get Ready' category was selected first and that the 'Resources' category was mostly chosen last in its approach yet, all users completed a category before exploring a subsequent one.

This indicates that not only it is necessary to test a prototype in order to gain user feedback but by gathering insightful information from users, it provides resources and directions for refinements. The 'Prep Deck' toolkit offers first-time homebuyers a preparatory aid that gathers information and resources in a central location. It further offers an appealing design, promoting its use, and a tangible and self-directed tool supporting communication and fostering knowledge. The use of the 'Prep Deck' can help build confidence by educating and preparing first-time homebuyers in the home preparation journey as well as expose and teach them about right-sizing. This not only arms the future homeowners with knowledge but can establish clearer boundaries leading to more assertive parameters. It can also benefit the professional team since the first-time homebuyer can better communicate their intentions and needs, which can possibly reduce the property search time and the frustration from both parties.

The participants provided useful feedback to incorporate in the improvement of future development. The recommendations below offer suggestions that could be explored and tested further to advance the 'Prep Deck'.

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Catering to a wide range of users

Even though more of the participants preferred the physical card-based tool, since it offered a tangible package facilitating interaction with a partner or industry professionals, a digital version could also be beneficial to various segments of the population. A digital forum, app or web-based, could be welcomed by some since it offers a quick way to access, store and share information. It is also easily updated and can reach a wider audience after its initial production.

The development of a mobile or web-based forum could offer added features such as varied customizable elements (colour, fonts, size, etc.), a note pad for keeping track of comments, a terminology section to clarify industry terms, an instruction sheet for those requiring direction, reminders of tasks to accomplish, quizzes to evaluate goals which all could be saved, stored and shared with various people that are involved in the process.

Increasing design appeal, positive association and overall use

Different design features could be added to the overall composition, including the title of the category on both sides of the card could to promote clarity. Further highlighting the four colour coded categories, featuring a distinctive graphical representation of a house, could uniquely define each theme. Numbering each card within each category and linking the information by referencing other cards with a complementary theme, (placed on the reverse side), could complete the information sequencing. This would refine the design and associate correlated information or steps to accomplish or research (see figure 25).

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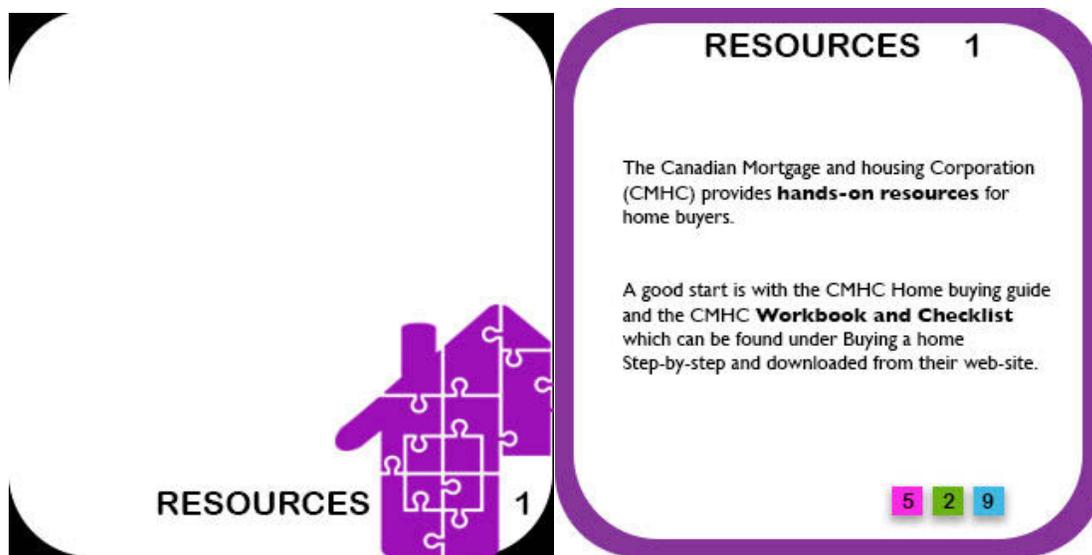


Figure 25. New Design Refinement

Support clarity and assist understanding

To enhance the 'Prep Deck' experience and facilitate comprehension a few suggestions are highlighted, for example, incorporating a lexicon presented on the back of the title card, with industry terminology, which could assist in defining uncommon vocabulary. Providing more consistency when presenting information in phrasing, reducing sentences and adopting a more bullet point presentation to quickly present the information. Adding supplementary cards in each category featuring accompanying information, resources and personal value and lifestyle assessment creates a more inclusive package.

Furthermore, complementing the toolkit with a separate booklet with the same formal qualities (size, fonts, overall composition, etc.) informs the user of the home buying process. This would feature a step-by step guide listing the timeline of various tasks, assessments to accomplish in the research, preparation, home search and purchasing phases.

5.3 Summary

The sources of information from the literature and the findings from the research methodologies culminated into key insights and revelations into the real estate market and the first-time homebuyer.

- 1) The rising cost of dwellings is in part due to the increase in home size over the past few decades. This has created a disproportionate housing to income ratio, which is causing first-time buyers (millennials between 22-37 years of age) to struggle to enter the real estate market. Home seekers will either have to wait longer to purchase a home or accept financial help from loved ones (new trend in the last 5-7 years) to pursue their endeavor.
- 2) In the last decade, a smaller size housing model has surfaced and is transforming the market, a trend projected to continue rising since the household occupancy is also declining. First-time home seekers are willing to consider properties of various size in order to ensure affordability and lifestyle expectations. They are concerned about choosing the right property, one that aligns with their budget, needs, wants, values and lifestyle choices.
- 3) First-time homebuyers are mostly aware of the financial and lifestyle implications that homeownership brings, and don't enter the housing market lightly. They are budget conscious but want to uphold an established lifestyle as well. Initially they are unrealistic about the realities of the market place, what you can get for the budget they have, but when exposed to those realities are willing to re-asses and compromise (not exposed in the literature).

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- 4) First-time homebuyers are willing and able to accomplish research, yet since the information is scattered and on different platform, they are overwhelmed and wonder what is applicable to them, hence, end up missing crucial detailed information.
- 5) First-time homebuyers are not conscious about right-sizing considerations, since no one mentions right-sizing or seem to know it exists. However, first-time home buyers seem to be struggling to do just that, right-size, which is to create a personalized and optimized living environment that aligns with their individual lifestyle.
- 6) First-time home buyers want to make an informed decision and while a framework can't guarantee a decision, a decision-making tool can group information, making it more manageable, and help reduce the effort by facilitating the assessment of options and criteria to guide decisions.

These insights highlight the need for a tool for gathering industry knowledge to prepare first-time homebuyers, and that a decision-making design intervention is needed to teach individuals about right-sizing, offering a platform to assess their personal criteria.

Further information gathered from the literature and the findings from the research methodologies revealed additional insights into the decision-making process and tool.

- 1) Physical media, such as a card-based tool offer a tactile artifact that is simple, easy to use, browse and share. It makes it less abstract and more accessible for

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first-time homebuyers, and it also provides a suitable artifact for rapid prototyping and testing.

- 2) A card-based tool helps structure the problem, promotes collaboration and facilitates communication, either with partners or industry professionals. It allows first-time homebuyers to gain industry knowledge, analyze alternative options as well as potential solutions.
- 3) The organization of the decision-making tool into categories makes the subject matter easier to reference, helps create focus, offers direction and can make the process less overwhelming.
- 4) A card-based decision-making tool needs to consider the card-based dimension to effectively present and organize the tool. Creating an appealing package featuring the dominant elements and principles of design and composition is essential to capture and engage first-time homebuyers. By engaging first-time homebuyers, it encourages content exploration and use of the decision-making tool.
- 5) A rapid prototype followed by usability testing validates the card-based approach, information design criteria and the dominant elements and principles of design. It is necessary to test a prototype in order to gain user feedback and gather insightful information to provide resources and directions for refinements.

The subsequent grouping of insights highlights the significant criteria of the decision-making process and tools, presenting the overall criteria to facilitate information and communication design.

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Since purchasing a home involves a multiplicity of phases and a progression of decisions, a tool can provide a tangible framework to facilitate the process. The 'Prep Deck' offers a home buying preparation decision-making toolkit to organize, direct and educate first-time home buyers. The process then can become more manageable and less daunting; therefore, the first-time homebuyers can take a well-rounded approach and feel more self-assured. It is also a tool to aid in evaluating lifestyle needs and goals through the right-sizing lenses as well as understanding the steps and implications of buying a home. It can offer new knowledge or validation of other research to put at ease the questions or concerns on any number of related subjects.

5.4 Limitations

As with every research project, the study faced limitations that impact the scope of its discoveries. This qualitative study was a preliminary exploration with a small sample population. There could be an opportunity to increase the sample size, which may lead to more nuanced results for further studies. Since the house purchase process is a unique experience for each person and couple, recruiting a larger collection of participants in all three groups, 1) real estate agents, 2) recent homeowners and 3) first-time home seekers could further inform the findings and benefit the research.

Additionally, the study was based only on interviews with recent first-time home buyers who undertook the house purchasing process with the support of a real estate agent, therefore, an evaluation of various home buying experiences could add to the study.

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Furthermore, the 'Prep Deck' home buying preparation kit prototype only offered twenty cards to draw from (five in each of the four categories) in the usability testing and could benefit by providing a more comprehensive set of cards to complement the findings.

Finally, even though the card-based prototype was well received, it was the only prototype tested and the lack of varied media could inhibit the true results. The study could benefit from a low-fidelity digital prototype to test in order to gain a true comparison of the media.

Chapter 6. Conclusion

The initial ambition of this thesis was to study housing selection for first-time homebuyers to enhance lifestyle choices through right-sizing, offering the optimization of living space in conjunction with lifestyle choices to create a set of unique living choices. As this is a relatively new concept in the real estate market, the movement was explored through a design intervention. The central question and sub-questions crossed design and cognitive science as its main fields with support from interior design, real estate, and decision-making tools. The study featured a literature review foundation and applied exploratory sequential qualitative research methods to discussed common themes. The overall exploration and data collected offered insights to address the question, "how can decision-making facilitate first-time homebuyers in right-sizing their home?"

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The research offers two main contributions: a tool to aid first-time homebuyers in their home buying preparation and teach them about right-sizing, and an approach for designers tasked with creating decision-making tools for similar complex problems both present areas for future research.

1. Preparation aid for first-time homebuyers

The 'Prep Deck' seemed to be received as a helpful aid for the first-time home buyer because the participants noted that the tool kit grouped relevant information and offered a set of guides with a series of prompts to aid in knowledge acquisition. They also revealed that the tool kit fostered areas of analysis addressing personal values and goals through prompting lifestyle questions. Further, it helped by presenting and clarifying topics, including right-sizing to inspire more in-depth research and analysis as well as assist in approaching complex subjects through a neutral platform. Participants also said that they valued the collection as it would contribute to their ability to gain confidence and assurance throughout the process. The participants further communicated that the tool kit helped in not feeling isolated and/or overwhelmed, since it offers direction, resources and guidance to obtain support.

The 'Prep Deck' offered a physical card-based design approach that seemed to be appreciated, as the participants noted it was a fun, tangible tool promoting interaction, collaboration, discussion with partners, family members and the professional team as well as self-directed play and inquiries. They also favored the card-based toolkit and categorized structure; they indicated that it offered sharing potential, basic accessibility, ease of manipulation, including grouping and sorting capabilities. The participants

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further noted that the card-based decision-making tool also promoted playful exchanges by making a complex process more user-friendly, approachable and less intimidating to make informed decisions, leading to right-sizing.

2. Approach for designing decision-making tool

The goal of a decision-making tool is to provide an informative, supportive platform to facilitate the assessment of opportunities, options, needs, values and future desire to nurture a topic. This contribution can help guide designers in presenting an organized approach to create decision-making tools for comparable intricate topics.

This contribution considered the research through design philosophy, the human-centered design methodology and the gathered discoveries from this study to highlight an approach to designing decision-making tools. It presents a sequence of practices by offering sequential guidelines, which include: the initial segment, 1) research driven criteria, defining the topic and understanding the scope and user through appropriate research methods, 2) the decision-making process, focusing on the content and organization of the information from the knowledge gained in the research, 3) the presentation of a beautifully packaged tool, engaging the user, through visual communication criteria, 4) usability testing, gaining feedback from the users, assisted by a prototype, 5) refinement, to enhance the components and implementing a final solution (see Figure 26).

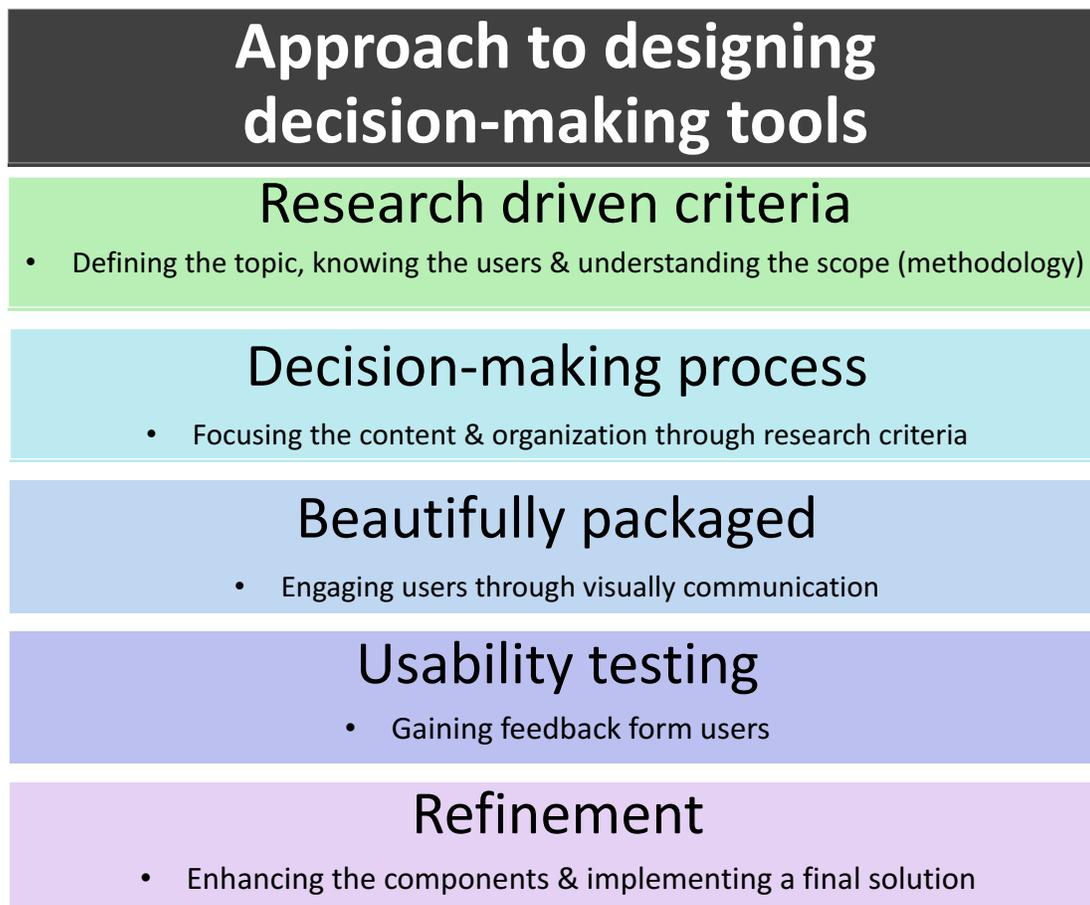


Figure 26. Approach to Designing Decision-Making Tools.

6.1 Future Research

Future research could offer opportunities featuring greater potential for this card-based decision-making tool kit. It could be modified for other populations, not limited to first-time homebuyers. Those could include: second or third time home buyers, home sellers, commercial properties (buyers and sellers) and real estate agents who want to reach a greater audience. It may also offer other opportunities for creating card-based decision-making tools for similar complex topics/problems.

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Further research on home buying touchpoints could be conducted to ensure all areas have been identified and incorporated in the toolkit. A shadowing study of individuals and/or couples through the preparation steps of the home purchasing journey could elevate the identification of those touchpoints.

Further research could also explore a complimentary media based format. The creation and testing of a digital forum could compliment the research by comparing the two formats and evaluating the results. This could prove beneficial to the inquiry and might offer further knowledge and elevate the approach.

Hopefully, the result of this study contributed in minimizing the overwhelming and intimidating feeling of buying a home by offering first-time homebuyers a preparation tool and assist in exploring the alternative housing choices of right-sizing.

As designers, we have the potential to act as design agents and through design research contribute to the field of design by empowering people with tools and knowledge.

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Appendix A

Ethics Approval Certificates- A

How Design Tools Facilitate Right-sizing Choices for First-time Homebuyers

CERTIFICATION OF INSTITUTIONAL ETHICS CLEARANCE

Ethics clearance for the following research has been **cleared** by the Carleton University Research Ethics Board-B (CUREB-B) at Carleton University. CUREB-B is constituted and operates in compliance with the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* (TCPS2).

Ethics Protocol Clearance ID: Project # 105540

Principal Investigator: Lois Frankel, Carleton University

Research Team (and roles) (If applicable): **Lois Frankel (Primary Investigator)**
Claudie St Arnaud (Student Researcher)

Study Title: How design tools facilitate right-sizing choices for first-time homebuyers? [Claudie St. Arnaud]

Funding Source (If applicable): [[RelatedAwardsDetails]]

Effective: **November 16, 2016**

Expires: **November 30, 2017**

Restrictions:

This certification is subject to the following conditions:

1. Clearance is granted only for the research and purposes described in the application.
2. Any modification to the approved research must be submitted to CUREB-B. All changes must be approved prior to the continuance of the research.
3. An Annual Application for the renewal of ethics clearance must be submitted and cleared by the above date. Failure to submit the Annual Status Report will result in the closure of the file. If funding is associated, funds will be frozen.
4. A closure request must be sent to CUREB-B when the research is complete or terminated.
5. Should any participant suffer adversely from their participation in the project you are required to report the matter to CUREB-B.
6. Failure to conduct the research in accordance with the principles of the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans 2nd edition* and the *Carleton University Policies and Procedures for the Ethical Conduct of Research* may result in the suspension or termination of the research project.

Please email the Ethics Coordinators at ethics@carleton.ca if you have any questions. If a researcher requires a certificate with a signature, they may contact ethics@carleton.ca to have one generated.

CLEARED BY:

Andy Adler, PhD, Chair, CUREB-B

Shelley Brown, PhD, Vice-Chair, CUREB-B

Date:

November 16, 2016

Appendix B

Sample Email for Potential Real Estate Agents

How Design Tools Facilitate Right-sizing Choices for First-time Homebuyers



Dear _____, (real estate agents)

My name is Claudie St-Arnaud and I am a Student in the Master of Design Program at Carleton University. I am collecting data for a project that seeks to study housing selection for first-time homebuyers to enhance lifestyle choices by right-sizing their home. This study aims to learn more about the experiences, behaviors, attitudes, successes and challenges regarding the home buying preparation and process in order to create a decision-making tool for first-time home seekers.

I am writing you today to ask you if you would like to partake in my research by participating in a interview. It would take place either at a suitable location or by phone at a convenient date and time. This study involves one **30 to 45 minute interview**. With your informed consent, I will contact you to discuss a convenient date, time and location for the information gathering process / interview. Care will be taken to protect your identity by using pseudonyms when disseminating any results. You will have the right to end your participation in the study up until January 15, 2017, for any reason, by informing the researcher. If you choose to withdraw, all information you provided will be immediately destroyed.

We seek experienced real estate agents, male and/or female (licensed) with at least 5 years of real estate experience with various clientele, especially first-time home seekers. We would like permission to take notes during the interview as well as audiotape the session. If you would like to participate and agree to these activities, please contact Claudie St-Arnaud at claudie.starnaud@carleton.ca. At the time of the interview, you will be asked to sign an informed consent and no compensation will be offered for your participation.

The ethics protocol for this project was reviewed by the Carleton University Research Ethics Board-B (protocol #105540), which provided clearance to carry out the research. (Clearance expires on:15/04/2017) Should you have questions or concerns related to your involvement in this research, please contact Dr.Andy Adler, chair, Carleton university Research Ethics Board-B (by phone: 613-520-2600 ext. 4850 or email: ethics@carleton.ca).

If you have any questions, please contact me at claudie.starnaud@carleton.ca.

Sincerely,



Claudie St-Arnaud

Master of Design Student
School of Industrial design
Carleton University
claudie.starnaud@carleton.ca

Lois Frankle, Ph.D

Associate Professor
School of Industrial design
Carleton University
lois.frankel@carleton.ca

Appendix C

Sample Email for Potential Recent First-time Homeowners

How Design Tools Facilitate Right-sizing Choices for First-time Homebuyers



Dear _____, (recent home owner)

My name is Claudie St-Arnaud and I am a Student in the Master of Design Program at Carleton University. I am collecting data for a project that seeks to study housing selection for first-time homebuyers to enhance lifestyle choices by right-sizing their home. This study aims to learn more about the experiences, behaviors, attitudes, successes and challenges regarding the home buying preparation and process in order to create a decision-making tool for first-time home seekers.

I am writing you today to ask you if you would like to contribute in my research by participating to an interview. It would take place either at a suitable location or by phone at a convenient date and time. This study involves one **30 to 45-minute interview**. With your informed consent, I will contact you to discuss a convenient date, time and location for the information gathering process / interview. Care will be taken to protect your identity by using pseudonyms when disseminating any results. You will have the right to end your participation in the study up until January 15, 2017, for any reason, by informing the researcher. If you choose to withdraw, all information you provided will be immediately destroyed.

We seek male and female homeowners over the age of 18 years old who have owned their first dwelling a minimum of 1 year and a maximum of 3 years'. We would like permission to take notes during the interview as well as audiotape the session. If you would like to participate and agree to these activities, please contact Claudie St-Arnaud at claudie.starnaud@carleton.ca. At the time of the interview, you will be asked to sign an informed consent and no compensation will be offered for your participation.

The ethics protocol for this project was reviewed by the Carleton University Research Ethics Board-B (protocol # 105540), which provided clearance to carry out the research. (Clearance expires on:15/04/2017) Should you have questions or concerns related to your involvement in this research, please contact Dr.Andy Adler, chair, Carleton university Research Ethics Board-B (by phone: 613-520-2600 ext. 4850 or email: ethics@carleton.ca).

If you have any questions, please contact me at claudie.starnaud@carleton.ca. Sincerely,



Claudie St-Arnaud

Master of Design Student
School of Industrial design
Carleton University
claudie.starnaud@carleton.ca

Lois Frankle, Ph.D

Associate Professor
School of Industrial design
Carleton University
lois.frankel@carleton.ca

Appendix D – Real Estate Agent Consent Letter



Title: How design tools facilitate right-sizing choices for first-time homebuyers?

Date of ethics clearance: November 18, 2016

Ethics Clearance for the Collection of Data Expires: 15/04/2017

I _____, choose to participate in a study on design tools facilitating right-sizing choices for first-time homebuyers. This study aims to perform an analysis of creative, supportive and decision-making tools to offer valuable and accessible solutions for novice buyers. The result of this study may contribute to the design of a new tool to help first-time homebuyers make suitable and sustainable decisions. The goal is to study how people select the homes they buy in order to analyze and create a decision-making tool to enhance first-time home buyer's lifestyle choices by right-sizing their home. **The researcher for this study is Claudie St-Arnaud in the Master of Design program in the School of Industrial Design at Carleton University.**

She is working under the supervision of Professor Lois Frankel, in the School of Industrial Design and Academic Director at 1125@Carleton and Jim Davies, in the Institute of Cognitive Sciences at Carleton University.

This study involves one **30 to 45-minute interview**. We seek male and female licensed real estate agents who have attained a minimum of 5 years' experience in the residential real estate field and have various clientele especially first-time home seekers. We are also asking for your consent to capture information through note taking and audio-recording in a non-obstructive way, in order to document the overall interview. Individual identity will be altered for future publications by adopting pseudonyms. No compensation will be offered to the participants.

You have the right to end your participation in the study up until January 15, 2017, for any reason. You can withdraw by phoning or emailing the researcher or the research supervisors. If you withdraw from the study, all information you have provided will be destroyed.

All research data, including audio-recordings and any notes will be encrypted. Any hard copies of data (including any handwritten notes or USB keys) will be kept in a locked cabinet at Carleton University. Research data will only be accessible by the

How Design Tools Facilitate Right-sizing Choices for First-time Homebuyers

researcher and the research supervisors Should the interview be conducted using Skype or Facetime, the data collection will be subject to the data security and confidentiality laws of the United States, were their servers are located.

Once the project is completed, all research data will be kept for seven years on a password protected external drive (or data key). At the end of seven years, all research data will be securely destroyed. (Electronic data will be deleted and hard copies will be shredded.) Participants information will not be kept for further studies.

The ethics protocol for this project was reviewed by the Carleton University Research Ethics Board-B (protocol #105540), which provided clearance to carry out the research. Should you have questions or concerns related to your involvement in this research, please contact Dr. Andy Adler, chair, Carleton university Research Ethics Board-B (by phone: 613-520-2600 ext. 4850 or email: ethics@carleton.ca).

You may also contact the Researcher at claudiestarnaud@cmail.carleton.ca or the supervisor at lois.frankel@carleton

If you consent to your participation in this research project, please sign the appropriate sections below:

My name is: _____
(please print name)

I, the participant, consent to audiotaping session:

yes_____ no_____

I, the participant, consent that data may be used in publications or presentations of any kind:

yes_____ no_____

Signed by: _____ (please sign name)

Date: _____

Appendix E – Recent First-time Homeowners Consent Letter



Title: How design tools facilitate right-sizing choices for first-time homebuyers?

Date of ethics clearance: November 18, 2016

Ethics Clearance for the Collection of Data Expires: 15/04/2017

I _____, choose to participate in a study on design tools facilitating right-sizing choices for first-time homebuyers. This study aims to perform an analysis of creative, supportive and decision-making tools to offer valuable and accessible solutions for novice buyers. The result of this study may contribute to the design of a new tool to help first-time homebuyers make suitable and sustainable decisions. The goal is to study how people select the homes they buy in order to analyze and create a decision-making tool to enhance first-time home buyer's lifestyle choices by right-sizing their home. **The researcher for this study is Claudie St-Arnaud in the Master of Design program in the School of Industrial Design at Carleton University.**

She is working under the supervision of Professor Lois Frankel, in the School of Industrial Design and Academic Director at 1125@Carleton and Jim Davies, in the Institute of Cognitive Sciences at Carleton University.

This study involves one **30 to 45-minute interview**. We seek recent post-occupant first-time homeowners, male and/or females over 18 years of age with a minimum of 1 year and a maximum of 3 years of homeownership. We are also asking for your consent to capture information through note taking and audio-recording in a non-obstructive way, in order to document the overall interview. Individual identity will be altered for future publications by adopting pseudonyms. No compensation will be offered to the participants.

You have the right to end your participation in the study up until January 15, 2017, for any reason. You can withdraw by phoning or emailing the researcher or the research supervisors. If you withdraw from the study, all information you have provided will be destroyed.

All research data, including audio-recordings and any notes will be encrypted. Any hard copies of data (including any handwritten notes or USB keys) will be kept in a locked cabinet at Carleton University. Research data will only be accessible by the researcher and the research supervisors. Should the interview be conducted using Skype or Facetime, the data collection will be subject to the data security and

How Design Tools Facilitate Right-sizing Choices for First-time Homebuyers

confidentiality laws of the United States, where their servers are located.

Once the project is completed, all research data will be kept for seven years on a password protected external drive (or data key). At the end of seven years, all research data will be securely destroyed. (Electronic data will be deleted and hard copies will be shredded.) Participants information will not be kept for further studies.

The ethics protocol for this project was reviewed by the Carleton University Research Ethics Board-B (protocol #105540), which provided clearance to carry out the research. Should you have questions or concerns related to your involvement in this research, please contact Dr. Andy Adler, chair, Carleton University Research Ethics Board-B (by phone: 613-520-2600 ext. 4850 or email: ethics@carleton.ca).

You may also contact the Researcher at claudiestarnaud@cmail.carleton.ca or the supervisor at lois.frankel@carleton

If you consent to your participation in this research project, please sign the appropriate sections below:

My name is: _____
(please print name)

I, the participant, consent to audiotaping session:

yes _____ no _____

I, the participant, consent that data may be used in publications or presentations of any kind:

yes _____ no _____

Signed by: _____ (please sign name)

Date: _____

Appendix F

Interview Questions for Real Estate Agents

Semi-Structured Interview - **Real Estate agents**

1. Do you provide any tools or handouts to 1 st time homebuyers before embarking on the home search? ____ Yes ____ No
2. Please list the types of tools offered or referred to. (N/A, if not applicable)
3. Out of the tools you listed above, which ones are the most helpful to 1 st time homebuyers in assessing their home buying direction? (N/A, if not applicable)
4. Who are the most common 1 st time homebuyers?
5. What are your general impressions of the typical 1 st time homebuyers in Ottawa?
6. Generally, what seems to be on their wish list in terms of....
 - a. Location (city vs suburbia vs country or specification of neighborhood)
 - b. New vs older home (age range of homes)
 - c. Type of home (condo vs town home vs semi-detached vs detached)
 - d. Outdoor space (balcony, back yard deck, small yard, medium size yard, large yard)
 - e. Convenience to amenities, services and transportation
 - f. Interior layout (Room distribution)
 - g. Interior features (Finishes and features)
 - h. Orientation to natural light
7. How do 1 st time homebuyers know how much they can afford to spend on a home (mortgage and monthly expenses)? __ Yes __ No
 - a. How did they attain that information?
 - b. Are they usually realistic in their house affordability projections? Has that changed over time?
 - c. Do they adhere to their intended budget?
8. How do they look to you, the agent to guide them through the assessment of house affordability?
9. How do 1 st time homebuyers know about the initial supplementary costs of home buying (legal fees, land transfer taxes, moving cost, mortgage broker fees, etc.)
10. How much do 1 st time homebuyers know about the long term costs of a home and yard maintenance? (heating/cooling, water, electricity, land taxes, home upkeep, home improvements, etc.)
11. Are 1 st time homebuyers purchasing for their immediate or future needs?
12. Is there an average length that 1 st time homebuyers reside in their first home? ____ years.
13. Are there common ways that first-time homebuyers choose the location of their home?
14. Ultimately, what do 1 st time homebuyers base their decisions on when deciding a particular home? Please rank them from 1 to 10, 1 being the most pertinent or applicable.

How Design Tools Facilitate Right-sizing Choices for First-time Homebuyers

- _____ Location
- _____ Outdoor space
- _____ Convenience to amenities and services
- _____ Interior layout (Room distribution)
- _____ Interior features (Finishes and features)
- _____ Emotional response to the environment (either neighborhood /house/property)
- _____ Financial means
- _____ Proximity to family or loved ones
- _____ Proximity to work
- _____ Familiarity or association to surroundings

15. Is there a difference between 1 st time home buyer's and veteran purchasers?

Appendix G

Interview Questions for Recent First-Time Homeowners

Semi-Structured Interview – **Recent First-Time Homeowners**

1. How long ago did you purchase your home? _____ years
2. What prompted you to buy a home?
3. Did you do any research or preparation on your own beforehand? ... if so what type?
4. Did you utilize any tools to help you in your search? If so what kind and were they useful?
5. How did you find the house buying process? Did you have any challenges?
6. If you were to compare the beginning and the end of your home search, did your expectations or criteria change in any way? If so why?
7. Overall do you feel you made the right choice? If not, why not and if so, why?
8. Prior to the beginning of your search did you know the amount you could spend on a home? If so how did you figure out that price point?
9. Initially did you have a set budget? If so did you stick to it or did you go over budget?
10. What were the main deciding factors in your choice?
11. How long do you plan to stay in your current home?
12. What do you wish you knew in retrospect?
13. Do you feel you made any mistakes in the home buying process and selection? ... If so what would those be?
14. What would you do differently knowing what you know now?
15. What kind of advice would you offer first-time homebuyers?

Appendix H – Ethics Approval Certificate – B

CERTIFICATION OF INSTITUTIONAL ETHICS CLEARANCE

The Carleton University Research Ethics Board-B (CUREB-B) has granted ethics clearance for the changes to protocol to research project described below and research may now proceed. CUREB-B is constituted and operates in compliance with the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* (TCPS2).

Ethics Clearance ID: Project # 105540

Principal Investigator: Lois Frankel

Co-Investigator(s) (If applicable): **Lois Frankel (Primary Investigator)**
Claudie St Arnaud (ACVS Staff)

Project Title: How design tools facilitate right-sizing choices for first-time homebuyers? [Claudie St. Arnaud]

Funding Source:

Effective: **June 26, 2017**

Expires: **November 30, 2017.**

Please email the Research Compliance Coordinators at ethics@carleton.ca if you have any questions or if you require a clearance certificate with a signature.

CLEARED BY:
2017

Date: June 26,

Andy Adler, PhD, Chair, CUREB-B

Shelley Brown, PhD, Vice Chair, CUREB-B

How Design Tools Facilitate Right-sizing Choices for First-time Homebuyers



Office of Research Ethics
5110 Human Computer Interaction Building
1125 Colonel By Drive
Ottawa, ON K1S 5B6
Tel: (613) 520-2600, ext. 2517

August 4, 2017

Lois Frankel
School of Industrial Design
3470 Mackenzie Building

Re: How can design tools facilitate right-sizing choices for first-time home buyers? (Protocol # 105540)

Dear Professor Frankel,

This letter is to address the apparent inconsistency between the date of ethics clearance and the date on which research was conducted for the following study: “How can design tools facilitate right-sizing choices for first-time home buyers?” This delay in ethics clearance was caused by a technical issue. Carleton University Research Ethics Board-B confirms that the timing of research conducted by Claudie St. Arnaud was ethically appropriate.

Sincerely,



Andy Adler
Chair, Carleton University Research Ethics Board-B

cc: G. DuVal, Director, Office of Research Ethics
B. Campbell, Vice-Chair, Carleton University Research Ethics Board-B
C. St. Arnaud, Master’s Candidate, School of Industrial Design

Appendix I – Sample Poster for First-time Home Seekers



Participate in a study on First-time home buying.

The testing will take approximately 1 hour to complete and will be scheduled at a convenient time and location to accommodate participants. You will be asked to engage in a series of activities focusing on decision-making tools to facilitate right-sizing a first home.

During the study you be asked to provide feedback on your experience, findings as well as the evaluation of the components of the decision-making tool kit, the 'Prep Deck', a home decision-making tools.

To participate in this study you must be:

- At least 18 years old. (single or in a couple)
- Have not previously owned a property.
- Have an interest in purchasing a first home.

Interested in participating? Please contact.

Claudie St-Arnaud, claudie.starnaud@carleton.com

* You will be compensated with a \$10.00 Starbucks gift card

Appendix J – First-Time Home Seekers Consent Letter



Title: How design tools facilitate right-sizing choices for first-time homebuyers?

Date of ethics clearance: 06/04/2017

Ethics Clearance for the Collection of Data Expires: 01/06/2017

I _____, choose to participate in a study on design tools facilitating right-sizing choices for first-time homebuyers. This study aims to perform an analysis of creative, supportive and decision-making tools to offer valuable and accessible solutions for novice buyers. The result of this study may contribute to the design of a new tool to help first-time homebuyers make suitable and sustainable decisions. The goal is to study how people select the homes they buy in order to analyze and create a decision-making tool to enhance first-time home buyer's lifestyle choices by right-sizing their home. **The researcher for this study is Claudie St-Arnaud in the Master of Design program in the School of Industrial Design at Carleton University.**

She is working under the supervision of Professor Lois Frankel, in the School of Industrial Design and Academic Director at 1125@Carleton and Jim Davies, in the Institute of Cognitive Sciences at Carleton University.

This study involves a **1 hour testing session**. We seek first-time home searchers, male and/or females over 18 years of age who have not previously owned property and have an interest in purchasing their first home. We are also asking for your consent to capture information through note taking and audio-recording in a non-obstructive way, in order to document the overall process. Individual identity will be altered for future publications by adopting pseudonyms. A \$10.00 Starbucks gift card will be offered to participants.

You have the right to end your participation in the study up until June 1, 2017, for any reason. You can withdraw by phoning or emailing the researcher or the research supervisors. If you withdraw from the study, all information you have provided will be destroyed.

All research data, including audio-recordings and any notes will be encrypted. Any hard copies of data (including any handwritten notes or USB keys) will be kept in a locked cabinet at Carleton University. Research data will only be accessible by the researcher and the research supervisors.

How Design Tools Facilitate Right-sizing Choices for First-time Homebuyers

Once the project is completed, all research data will be kept for seven years on a password protected external drive (or data key). At the end of seven years, all research data will be securely destroyed. (Electronic data will be deleted and hard copies will be shredded.) Participants information will not be kept for further studies.

The ethics protocol for this project was reviewed by the Carleton University Research Ethics Board-B (protocol #106540), which provided clearance to carry out the research. Should you have questions or concerns related to your involvement in this research, please contact Dr. Andy Adler, chair, Carleton university Research Ethics Board-B (by phone: 613-520-2600 ext. 4850 or email: ethics@carleton.ca).

You may also contact the Researcher at claudiestarnaud@cmail.carleton.ca or the supervisor at lois.frankel@carleton

If you consent to your participation in this research project, please sign the appropriate sections below:

My name is: _____
(please print name)

I, the participant, consent to audiotaping/videotaping session:

yes _____ no _____

I, the participant, consent that data may be used in publications or presentations of any kind:

yes _____ no _____

Signed by: _____

(please sign name)

Date: _____

Appendix K – User Testing Questionnaire

First-time home buying decision-making tools
Questionnaire
Evaluating the 'PREP DECK'

CUREB-B Clearance #106540

1. Do you think this is a tool you would utilize in your home search, why or why not?
2. From who would you like to get The Prep Deck toolkit?
3. How would you envision using the cards and the decision-making The Prep Deck?
4. What might improve your experience using the toolkit? What works, what doesn't?
5. Did you learn anything working with The Prep Deck tools?
6. Any additional feedback you would like to share? (Please indicate your comments on the reverse side)