The Thoughtful Explorer

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Abstract

Grocery shopping presents unique challenges for international students, as it involves navigating unfamiliar retail environments, financial constraints, and impulse-driven decision-making. Unplanned purchases, often influenced by emotional and environmental triggers, can be both a financial strain and a means of cultural exploration. This study examines the factors influencing unplanned grocery shopping among international students in Toronto, Canada, using impulse buying theory to analyze the drivers of spontaneous purchases and self-regulation theory to explore strategies for managing them.

The research employs a Research through Design (RtD) approach, focusing on the iterative development and testing of a digital tool prototype designed to help manage unplanned grocery spending. This tool incorporates features such as a "spontaneity budget," purchase tracking, and reflective prompts to help students regulate unplanned purchases while allowing space for cultural engagement. User testing with international students provides insights into the tool's usability and its potential role in fostering self-awareness and adaptation in the context of Canadian grocery stores.

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Dedication

To Mumma, Papa and my favourite member of the family: Google Deshmukh.

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Introduction

"As an international student, I remember my first visit to a grocery store in Canada. It was a sprawling supermarket called No Frills in Brampton, and I was immediately struck by its sheer scale. Walking through the numerous aisles, I felt a mix of emotions: a sense of curiosity about the range of unfamiliar products and brands, a cautiousness about my decision-making, and a heightened self-awareness about being foreign in this new environment. I didn't want to give away that it was my first time navigating this space, which brought a kind of vulnerability and pressure to appear confident.

Certain products seemed familiar since I had encountered them back home, while others—like in-store products under the 'No Name' label—were completely new, making it hard to discern their quality or value. Deals and discounts were scattered across the store, but I wasn't sure if they were genuinely good deals. I made a mental note of a few products from India, thinking I might come buy them later if I felt homesick. At the checkout counter, I carefully watched those ahead of me, mimicking their gestures, greetings, and body language to blend in. Even the simple act of making a payment—something familiar to me back in India—required attention and vigilance.

That day, I only planned to buy a tube of toothpaste and a packet of bread, but I ended up purchasing a baguette as well. Baguettes were a rarity in Indian bakeries, so I felt quite curious to try one. It was on sale, and it appeared to be a good deal, though I wasn't sure entirely. After some thought, I decided to give in and buy one, thinking that it was a risk I was willing to take. Over time, this feeling of being overwhelmed and my sense of curiosity abated as I became more familiar with the products, brands, and the retail environment in Toronto, but it resurfaces occasionally when I encounter new items or navigate new stores."

Over the course of many conversations with fellow international students, I've come to realize that this experience is a common one, shared by many navigating similar transitions.

Background & Context

For many international students, navigating grocery stores in Canada can often be more than a routine task; it is an encounter with cultural unfamiliarity and decision-making complexities. Grocery shopping, a seemingly simple activity, can become an emotionally and cognitively loaded experience. Students are often caught between a variety of forces: curiosity about unfamiliar products, an unfamiliarity about how to navigate new retail spaces, a nostalgia for items from home, and the temptation of deals or discounts. I hypothesize that these dynamics make grocery shopping a prime setting for unplanned and impulse purchases, where the pressures of adaptation and impulsive decisions intersect. Understanding this interplay provides a foundation for exploring the broader phenomenon of impulse buying and its relevance to the international student experience.

Impulse Buying as a phenomenon

Impulse buying is a well-documented consumer behavior characterized by spontaneous decision-making and immediate gratification. It is defined as episodes in which "a consumer experiences a sudden, often powerful and persistent urge to buy something immediately" (Rook, 1987; as quoted in Iyer et al., 2020). Impulse buying is influenced by external stimuli, such as promotional displays and sensory cues in retail environments, as well as internal factors like

one's emotional states. All impulse buys are unplanned; however not all unplanned purchases stem from impulsivity. An impulse purchase typically comes with that distinctive rush of excitement and urgency – the "I must have this now" feeling. What sets impulse buying apart from general unplanned purchases is the emotional weight behind the decision. In contrast, unplanned purchases often emerge from a more measured thought process, where shoppers might pause to consider the item's utility or value, even if they hadn't initially intended to buy it (Verplanken & Sato 2011). These decisions, while spontaneous, tend to be justified through practical reasoning rather than emotional desire.

Unplanned Buying

While often used interchangeably, unplanned purchases represent a more expansive category of consumer behavior than impulse buying. As Iyer et al. (2020) point out, unplanned purchases simply refer to any items we pick up that weren't on our mental or physical shopping list beforehand. These might range from the perfectly rational – spotting pasta sauce and remembering your pantry is empty – to the opportunistic grab of a deeply discounted item. Take, for instance, when we spot an unexpected sale on a product we regularly use. Buying it might be unplanned but lacks the emotional charge that Iyer et al. (2020) identify as central to truly impulsive purchases.

Unplanned Purchases and Impulse Buying: A note on Overlaps and Divergences

In my research journey, I've learned that the distinction between unplanned and impulsive purchases isn't as straightforward as it might seem. Early researchers saw these terms as

interchangeable, focusing mainly on categorizing which products were likely to be bought on impulse (Kollat & Willett, 1969; as cited in Vohs & Faber, 2007). This view shifted attention to the consumer's psychology rather than the products themselves, the argument being that "it is the individuals, not the products, who experience the impulse to consume" (Rook & Hoch, 1985; as quoted in Iyer et al., 2020). Their insight helped establish a crucial distinction - while every impulse purchase is unplanned, the reverse isn't always true. Take, for instance, when we spot an unexpected sale on a product we regularly use. Buying it might be unplanned but lacks the emotional charge that Iyer et al. (2020) identify as central to truly impulsive purchases.

Yet in practice, I've observed that these behaviors often intertwine. Both types of purchases happen spontaneously and respond to environmental triggers. Rodrigues et al. (2021) point out how store layouts, sensory experiences, and promotional displays can spark both unplanned and impulsive buying decisions. This connection is why I found impulse buying theory so valuable for understanding unplanned grocery shopping - it helps explain how our environment shapes our spontaneous purchase decisions. In framing my thesis, I've chosen to look at unplanned grocery shopping through a wider lens that captures both emotion-driven impulse buys and more practical, spontaneous and unplanned decisions.

Research Questions

The primary purpose of this research was to develop and test a prototype of a digital tool to help international students at OCAD University manage and navigate unplanned and impulse grocery purchases. The following questions were developed to initiate the research that informed a methodology framework of participatory user-testing to gain insight from the target demographics.

1. What types of unplanned grocery purchases do international students at OCAD University make, and what factors drive these purchases?

2. What features of a digital tool would foster awareness of consumption, exploration of new retail spaces, and support international students at OCAD University in management of unplanned and impulse purchases?

Rationale

The rationale behind this study was rooted in the idea that unplanned purchases during grocery shopping is one among the many challenges international students experience as they navigate new retail spaces upon arriving in Canada. I believe that a trip to the grocery store, while routine, becomes a site where broader themes of adaptation play out—such as managing a budget, exploring new retail environments, unfamiliar products, or seeking a sense of familiarity. Retail spaces employ methods to encourage consumption through strategic product placement, colourful displays, and carefully worded deals and offers. These tactics, I believe, can put strain on newcomers such as international students who may already be experiencing acculturative stress: "the psychological and physical discomfort experienced as a result of adjusting to a new cultural environment" (Van Tilburg & Vingerhoets, 2006). Additionally, as Verplanken & Sato (2011) argue, the suggestive power of advertising, information overload, and shopping itself can contribute to decreased self-control, making consumers particularly susceptible to strategies that manipulate perceptions of value and necessity. This may be compounded by an unfamiliarity with Canadian brands and products, or a fascination for new and foreign brands and products that suddenly seem more accessible and tempting. I believe that this decreased self-control can lead to increased unplanned and impulse spending in everyday, low-stakes but high-frequency

contexts like grocery shopping. Because these decisions often unfold quickly and in response to immediate environmental cues, a mobile-based tool felt like a natural fit. Most international students already rely on their mobile devices to navigate unfamiliar retail spaces, compare prices, and manage day-to-day tasks (Rolf, 2017). A mobile format offered accessibility and familiarity—meeting users through a device they already use regularly. Whether during or after a shopping trip, the tool could provide timely prompts and reflections in a way that integrated seamlessly into their routines, without requiring significant behavioral change.

With this as my rationale, I drew on impulse buying theory and self-regulation theory to explore whether unplanned and impulse grocery purchases can be reframed as opportunities for learning and habit-building among international students.

Scope

The scope of my research is centred on understanding the factors influencing unplanned and impulse grocery purchases among international students at OCAD University and designing a digital prototype to help manage these behaviours. The decision to focus specifically on international students is intentional. Smith & Khawaja (2011) note that international students experience academic stress—a pressure not faced by other newcomer groups such as immigrants or refugees—while also sharing with them broader acculturative challenges such as financial strain and cultural adjustment in Canada. These compounded pressures make international students a group whose consumption behaviours warrant closer investigation. Unplanned and impulse grocery shopping may reflect both, the demands of adapting to a new retail environment and the practical realities of student life, offering a meaningful lens through which to explore how design can support more intentional spending habits. While the findings may have broader

implications, this study deliberately narrows its scope to address the experiences of international students at OCADU. By concentrating on this group, I aim to provide insights that are specific, though they may have application or value to broader populations such as newcomers or other domestic students who may have moved cities to study for example.

Chapter Overview

Chapter 1: Introduction

This chapter introduces important background and context by going over the phenomenon of impulse and unplanned buying. Drawing from my own experience as an international student— and my observations that others around me were navigating similar challenges—the introduction outlines the research questions, rationale, and scope for my thesis.

Chapter 2: Literature Review

This chapter reviews existing research on impulse and unplanned buying, self-regulation, and the international student experience. It highlights the gap in literature around how these behaviors intersect specifically for international students in everyday contexts like grocery shopping.

Chapter 3: Theoretical Frameworks

This chapter outlines the two key theoretical lenses used in the study: Impulse Buying Theory and Self-Regulation Theory. These frameworks help unpack the factors influencing unplanned and impulse purchases and guide the design of strategies to moderate them.

Chapter 4: Methods

This chapter outlines the Research through Design (RtD) methodology employed in the study. It details participant recruitment, the iterative design process, and the structure of the user testing sessions that informed each prototype iteration.

Chapter 5: Results

Findings from the focus group and user testing sessions are presented thematically. These include insights into what drives unplanned purchases, how students attempt to self-regulate, and the shopping behaviors that emerge during cultural adjustment.

Chapter 6: Discussion

This chapter reflects on the research findings in relation to existing literature and theoretical frameworks. It also discusses the evolving nature of unplanned spending, the role of cultural identity in consumption, and how user feedback shaped the design of the tool.

Chapter 7: Conclusion

The final chapter summarizes the key contributions of the study, discusses its limitations, and suggests potential directions for future research and design interventions.

Literature Review

This literature review adopts a structured approach to comprehensively understand the who and what of unplanned and impulse purchases among international students. I begin by examining international students as a demographic, laying out the processes of acculturation and associated stressors that impact their psychological well-being and identity formation. The review also acknowledges the role of curiosity as a positive factor that shapes their experiences in new cultural environments.

Following this, I turn to the nature of impulse buying itself, beginning with a discussion of unplanned purchases and the conceptual overlap between impulse and unplanned buying. Various theoretical perspectives—psychological, economic, and sociological—offer different lenses through which to examine this behavior. Furthermore, I investigate the key drivers of impulse buying at an individual level, including internal triggers, external influences, and social factors. Given the extensive research on impulse buying in young adults and students, I identify a

gap in the literature: the specific intersection of impulse buying and unplanned purchases among international students and the acute stressors that accompany this demographic.

Understanding the "who": International Students

To better understand impulse and unplanned buying and how it may manifest in international students as a group, it was important to first understand the international student experience more broadly. While studying in a new country is an exciting prospect, it comes with its own set of challenges that require significant adaptation. This adaptation process is often conceptualized through the framework of acculturation.

Acculturation and Acculturative Stress

Acculturation is defined as "the process of a newly arrived immigrant in learning the customs of the adopted country; the imposition of a foreign culture upon the subject group." (Harriman,1969, as cited in Van Tilburg & Vingerhoets, 2006). This process, while potentially enriching, can also be challenging. International students commonly experience acculturative stress, which "refers to the psychological and physical discomfort experienced as a result of adjusting to a new cultural environment" (Van Tilburg & Vingerhoets, 2006).

Kristiana et al. (2022) elaborate that the consequences of acculturative stress are wide-ranging, including "feelings of loss of certain behaviors that must be done differently or even cannot be done, as well as routines, habits, and intimate relationships that must also change". Another particularly significant challenge is homesickness, defined as the "longing for home and family

while absent from them" (Mish et al., 1986, as cited in Van Tilburg & Vingerhoets, 2006). Research also indicates that "international students often experience higher levels of discrimination and homesickness than students from host countries" (Poyrazli & Lopez, 2007 as cited in Kristiana et al., 2022).

Impact of Acculturative Stress on Identity and Psychological Well-being

The acculturation process can have profound effects on an international student's sense of identity and psychological well-being. Dr. Silvia Sovic, an academic with a background in history and anthropology, has conducted research on the experiences of international students through her work with the International Students' Experience Project at the University of the Arts London. Sovic (2008) referencing a model of culture shock developed by Lago and Shipton (1994), describes how international students often move through a series of transitional phases—including a honeymoon period, disorientation, reintegration, and eventual bicultural adjustment. While this study does not use these phases as a framework itself, Sovic notes that during such transitions, "their sense of identity is of critical importance; students often feel that they have lost their identity, or that their 'normal' identity has been disrupted and replaced by another due to study abroad." Drawing on Burke's (1991) research on the relationship between identity and stress, Sovic (2008) suggests that this disruption can lead to lower self-esteem, causing stress and even depression.

Curiosity as a Positive Factor in the International Student Experience

While the challenges of international study are significant, it was equally important to recognize the positive aspects that can emerge from this experience. Curiosity serves as an important psychological resource for international students navigating new environments. International students who possess high levels of curiosity may be more inclined to "meet new people and seek out new experiences to expand their knowledge and learn about the cultural values and traditions of their new environments" (Cankaya et al., 2018).

This curiosity-driven exploration aligns with what can described as one of the primary benefits of an international education (Gill 2007). As cited in Cankaya et al. (2018), studying abroad "provides many opportunities for students to enhance their academic and professional skills, expand international competencies, broaden their perspectives, and develop as persons by stretching and growing beyond their comfort zones".

The interplay between curiosity and stress creates a complex psychological landscape for international students that may significantly influence their consumer behaviours, including impulse buying tendencies. On one hand, acculturative stress may lead to comfort-seeking behaviours, while curiosity might drive exploration through consumption. This dynamic relationship between stress, curiosity, and consumption patterns forms the foundation for understanding the unique aspects of impulse buying among international student populations.

Understanding the "what": Impulse and Unplanned Buying

The understanding of impulse buying has undergone a transformation in consumer behavior research. In the late 1960s, scholars like Kollat and Willett viewed impulse purchases through a

narrow lens, focusing on specific items – think candy bars at checkout counters or magazines near the register (Kollat & Willett, 1969; as cited in Vohs & Faber, 2007). Their perspective was straightforward: certain products, by virtue of being inexpensive, visible, and easily accessible, were simply more likely to trigger spontaneous purchases.

This product-centric view, however, gave way to a more nuanced understanding of the psychological forces at play. Dennis Rook, a leading scholar in consumer behavior known for his work on the emotional and symbolic aspects of consumption, shifted the field's focus in his seminal 1987 paper, *The Buying Impulse*. He argued that impulse buying is fundamentally about the person, not the product. His observation that "it is the individuals, not the products, who experience the impulse to consume" opened new avenues for research into the psychological dimensions of shopping behavior (Rook, 1987).

Building on this foundation, researchers in consumer psychology and marketing like Vohs and Faber delved deeper into the personal traits that drive impulsive purchases. Their work revealed how factors such as an individual's propensity for sensation-seeking, their materialistic tendencies, and their capacity for self-regulation play crucial roles in spontaneous buying decisions. This shift in perspective highlighted that impulse buying isn't simply about what's being bought – it's about who's doing the buying and why.

This evolution in our understanding holds particular significance for international students, whose shopping patterns are often the product of a complex web of emotions and circumstances. Their spontaneous purchases might tell us more about how they explore unfamiliar consumer

environments or their adjustment to a new culture - than about the inherent appeal of the products themselves.

Drivers of Impulse Buying

Internal Drivers.

1. **Impulsivity and the Pleasure Principle:** Shoppers with high impulsivity often find themselves particularly vulnerable in modern retail environments, where carefully crafted displays and strategic product placement capitalize on their tendency toward quick decisions. From a behavioral economic standpoint, impulse buying is viewed as an *irrational purchasing decision* characterized by a struggle between *desire and willpower* (Hoch & Loewenstein, 1991, as cited Chow, 2020). Consumers may intend to make rational choices but succumb to the temptation of unplanned purchases due to, among other factors, high impulsivity.

2. **Sensation-Seeking:** This emerges as another powerful force behind impulse purchases. Research reveals how individuals with a strong appetite for novel experiences often find themselves drawn into exploratory shopping adventures (Whiteside and Lynam, 2001 as cited in Chow, 2020).

3. **Materialism and Self-Identity:** Materialism, defined as "the belief that acquiring material goods is central to happiness, well-being, and success" (Moser, 2020), plays a significant role in impulse buying. Chow (2020) highlights how impulse purchases are often driven by self-expression and identity formation, aligning with sociological perspectives that view

consumption as a means of signaling status or belonging. Those who place a high value on material possessions often turn to impulse buying to boost self-worth or showcase social status. Additionally, as Moser (2020) points out, "attitudes about self-identity interact with materialism; highly materialistic individuals who also report a large discrepancy between their actual and ideal self-identity are more likely to be impulsive buyers".

4. **Emotional Regulation** is another major driver of impulse buying. Impulse buying frequently serves as a mechanism for emotional regulation, helping individuals manage negative emotions or enhance positive ones. Shopping provides emotional satisfaction and an avenue for fantasy fulfilment, which can act as a temporary escape from stress or boredom (Hirschman & Holbrook, 1982, as cited in Gültekin & Özer, 2012). Hirschman & Holbrook (1982) suggest that hedonic shopping involves not just the acquisition of products but also the emotional and imaginative experiences associated with the act of purchasing. Additionally, they highlight that emotional arousal is a key motivator for consumer behaviour across various product categories, such as books, games, food, apparel, and sports activities. This reinforces the idea that impulse buying is not solely driven by necessity but also by the desire for emotional stimulation and temporary relief from everyday pressures.

External Drivers.

I hypothesize that international students, owing to their unfamiliarity with Canadian brands, pricing, and cultural norms, may be particularly susceptible to the retail strategies explained below that encourage unplanned and impulse purchases.

1. **Retail Atmospherics and Sensory Triggers:** These represent a sophisticated orchestration of environmental cues designed to bypass our rational decision-making processes. As Chow (2020) points out "retailers who render pleasant store atmosphere with deliberate manipulation of attributes, such as lighting, layout, presentation of merchandise, fixtures, floor coverages, colours, odours, music, scents, and friendly employees are also likely to increase impulse buying tendencies."

2. **Credit access, Promotions and Discounts:** These serve as particularly powerful catalysts for spontaneous purchasing, operating on both psychological and practical levels. As Moser (2020) points out "Communicating quick, easy credit or discounts can also encourage impulse buying". At the same time, Chow's (2020) research reveals how these strategies prove especially effective with student populations, who often find themselves caught in an interesting paradox: while operating on tight budgets, they're particularly susceptible to promotions that promise savings.

3. **Product Placement and Accessibility:** This is another key external driver. Retailers have perfected the art of positioning items at precisely the moments and locations where our decision-making resolve is most vulnerable. Consider the journey through a typical retail store: those seemingly random displays at eye level are anything but random. Products with high margins are given more space and emphasis, whereas those with lower margins are tucked away in higher or narrower shelves (Solomon, 2017 as cited in Chow, 2020). The checkout line represents perhaps the most calculated example of this strategy – that selection of small, appealingly packaged items we face while waiting to pay. These aren't merely

convenient last-minute offerings; they're carefully curated and positioned at a moment when our mental defenses are often lowered by shopping fatigue (Vohs & Faber, 2007). Travel-sized toiletries, candy bars, and glossy magazines create a corridor of impulse opportunities, each item chosen for its ability to trigger a quick "why not?" response.

Social Influences.

1. **Peer Influence:** This emerges as a particularly potent force in shaping student shopping behaviour. Shopping with friends, more specifically, can transform into a social experience where individual restraint often gives way to group enthusiasm. Research indicates that participants "who imagined a shopping scenario where they were accompanied by a group of friends reported a greater urge to purchase something and indicated more impulsive buying intentions, in comparison to participants who imagined shopping alone" (Luo, 2005, as cited in Moser, 2020). Chow (2020) argues that "impulse buying is influenced by consumer socialization agents, such as family, significant others, and peer groups, which reflect/reproduce larger social currents." Social dynamics can effectively dismantle usual decision-making filters, making spontaneous purchases feel more acceptable and even encouraged.

2. **Cultural Norms:** These play an equally compelling role, especially in societies where consumption has become deeply intertwined with identity and status. "Consumers from Western, individualistic countries (such as the US and Australia) are more likely to purchase impulsively than consumers from non-Western, collectivist countries (such as Singapore and Malaysia), despite having similar levels of individual buying impulsiveness" (Kacen & Lee,

2002 as cited in Moser, 2020). This difference reflects broader cultural norms: individualistic cultures tend to prioritize personal expression and emotional openness, which aligns with impulse buying as a form of self-expression. In contrast, collectivist cultures emphasize social harmony, emotional restraint, and group expectations, often discouraging overt displays of spontaneity (Kacen & Lee, 2002). Additionally, from a sociological perspective, impulse purchases—particularly of self-expressive products such as fashion and technology—help individuals construct and reinforce their social identity (Chow, 2020). I hypothesize that international students, especially those from collectivist backgrounds, may face pressure to adapt to Western consumer practices, which might inform their impulse and unplanned purchasing as they negotiate unfamiliar norms related to identity, status, and social belonging.

How Drivers of Impulse Buying may Impact International Students

Coping Mechanism for Acculturative Stress

Adjusting to a new cultural environment often comes with stress, homesickness, and a sense of loss. Impulse grocery shopping may serve as an *instant gratification mechanism*, offering temporary comfort. For example, a survey of Indian students studying in Dublin, Ireland found they often impulse shop "to repair their mood as they are alone," treating themselves for a quick feel-good boost" (Kalose, 2019). International students may impulsively purchase snacks, ready-to-eat meals, or familiar brands from home to *soothe feelings of homesickness* or deal with academic and emotional stress. Comfort foods, especially those high in sugar or salt, may be particularly appealing during moments of stress felt in the form of loneliness or cultural dissonance.

Impulsivity and Sensation-Seeking through Curiosity

The experience of navigating unfamiliar stores in a new cultural context may trigger or amplify impulsive or sensation-seeking tendencies. Imagine walking into a store where even routine shopping becomes an adventure driven by curiosity – novel brands, unfamiliar products, and different retail layouts can all heighten the emotional intensity of the shopping experience. This may transform a routine grocery run into a cultural expedition. Each aisle may offer an opportunity to discover local flavors and traditions, making spontaneous purchases not just about the products themselves, but about experiencing their host country's culture through its marketplace.

Identity Formation and Familiarity in Grocery Purchases

From a sociological perspective, international students may engage in impulse grocery shopping as a means of maintaining a connection to their cultural identity. A study on nostalgia-driven behaviour among international students noted that many students show a strong preference for products from their own country and will choose those over local products to reinforce their cultural identity (Hua et al., 2023). Purchasing specific food items from their home country— such as spices, sauces, or traditional snacks—may not always be a planned decision but rather an impulsive act of self-preservation, offering a sense of familiarity in an unfamiliar environment. On the other hand, students may also impulsively buy locally popular groceries to *assimilate into the host culture*, trying new foods to participate in local food customs.

Financial constraints and Marketing Tactics

Many international students may be unfamiliar with the marketing strategies used in grocery stores in Canada. The strategic placement of products, promotional discounts on unfamiliar items, or buy-one-get-one-free deals—may encourage impulsive purchases. The behavioral economic perspective suggests that these marketing strategies lower *self-regulation*, making students more likely to buy groceries they did not initially plan for. Moreover, student populations often find themselves caught in an interesting paradox: while operating on tight budgets, they are particularly susceptible to promotions that promise savings. International students may face an additional challenge in this arena—their unfamiliarity with local pricing structures can make it difficult to evaluate whether a "deal" truly represents good value. A discount that appears attractive might lead to an unplanned purchase, even when the regular price might be inflated or the item unnecessary. This effect is compounded by the psychological perception of scarcity—limited-time deals or "special offers" may create a sense of urgency, leading students to buy items they might not have considered otherwise. This aligns with the argument that impulse buying represents a *conflict between one's desire* (say, to get a good deal) *and willpower*, particularly in financial decision-making (Hoch & Loewenstein,1991 as cited in Chow, 2020).

Social Influence and Grocery Shopping Habits

Grocery shopping can be a social activity, and international students may be influenced by their peers when making purchases. Research has shown that individuals are more likely to make unplanned purchases when shopping with friends or others who influence them (Chen et al., 2021). Shopping with local students or friends from other cultures may encourage the impulsive

purchase of unfamiliar grocery items as part of an effort to explore new cuisines or fit in socially. As Chow (2020) points out, "shopping with friends provides a platform for young adults to gain acceptance from friends and identify themselves with their peer groups." Social media also plays a role—trendy food items (e.g., viral snacks, Instagram-worthy drinks) may tempt students into making impulse purchases to participate in online food culture.

Impulse Buying in Young Adults and Students

Young adults, including university students, are particularly susceptible to impulse buying. Research shows that age is a key factor, with young adult shoppers being more prone to aggressive and impulsive shopping behaviors compared to older adults (Eppinger, Nystrom, & Cohen, 2012, as cited in Chow, 2020). This impulsiveness is linked to a range of problematic financial behaviors, such as credit card misuse and high levels of debt. For example, Vohs & Faber (2007) found that impulsivity and lack of self-control were significant contributors to consumer debt among young adults. Similarly, a study of over 3,200 university students in the United States revealed that 23% of students had accumulated $1,000 or more in credit card debt, which was positively associated with stress and adverse mental health indicators, including body dissatisfaction (Nelson, Lust, Story, & Ehlinger, 2008, as cited in Chow, 2020). These findings underscore the broader financial and emotional toll of impulse buying in young adults. A recent debt survey in Canada reported that one in three (33%) young adults attributed their overspending to impulse buying, while 17% stated that their financial situations negatively impacted their mental health (Manulife Bank of Canada, 2019, as cited in Chow, 2020). College students who tie their self-esteem or self-worth to their appearance are particularly vulnerable, as they are more likely to spend money on shopping to improve their self-image, leading to

increased financial problems (Baumeister, 2002; Crocker & Luhtanen, 2003, as cited in Chow, 2020). These patterns suggest that excessive impulse and unplanned buying can result in a cycle of social, emotional, and financial strain, with far-reaching consequences for young adults (Silvera et al., 2008 as cited in Chow, 2020).

A gap: Impulse and Unplanned Buying among International Students

Despite a robust body of research on impulse buying among general and student populations, or on discretionary and high-value items such as clothing and electronics, little attention has been given to how these behaviors manifest in everyday, high-frequency contexts like grocery shopping for international students. These moments of unplanned spending might reflect broader patterns of cultural adaptation, identity negotiation, and financial decision-making. By examining grocery shopping among international students specifically, this study aims to show how these seemingly "low stakes" but frequent purchases both shape and are shaped by the broader process of acculturation among international students.

Theoretical Frameworks

Impulse Buying Theory and Self-Regulation Theory are the broad frameworks used to examine unplanned and impulse grocery purchases among international students.

Impulse Buying Theory

In this thesis, impulse buying theory serves as a key conceptual lens to examine unplanned and impulse grocery purchases among international students. Impulse buying theory explains how impulse purchases are triggered by both internal dispositions (e.g., impulsivity, sensation-seeking) and external cues (e.g., promotional displays, limited-time offers) (Iyer et al. 2019; Rook 1987). I adopt the specific view that impulse buying represents a self-regulatory challenge. In other words, this framework posits that momentary emotional or environmental triggers temporarily outweigh one's deliberative, goal-oriented behavior (Verplanken & Sato 2011).

Self-Regulation Theory

Self-regulation theory explains how individuals control their thoughts, emotions, and behaviours to achieve long-term goals while resisting short-term temptations. It describes how consumers either successfully regulate their spending behaviour or succumb to impulsive urges due to self-regulatory failure.

Verplanken & Sato (2011) situate impulse buying within two distinct motivational orientations—promotion-focused vs. prevention-focused self-regulation. Promotion-focused strategies emphasize gaining positive outcomes. Shoppers in a promotion mindset seek excitement, growth, and rewards. Buying a new outfit on impulse, for example, might reflect a desire to feel more stylish, confident, or socially successful—thus actively pursuing a bright, hopeful vision of oneself. Prevention-focused strategies, in contrast, revolve around avoiding negative outcomes. Here, an unplanned purchase might act as a "shield" against unpleasant emotions—such as buying comfort food to ward off stress or self-doubt. In this mindset, the shopper is motivated to prevent or reduce negative feelings (e.g., anxiety, low self-esteem) rather than to chase excitement.

Through these two orientations, self-regulation theory underscores that impulse buying is not purely about lacking willpower: it can be driven by diverse emotional needs and coping strategies. In the context of international students, this dual perspective illuminates how unplanned grocery purchases might serve different functions – from indulging curiosity and

excitement about novel products (promotion) to soothing homesickness or acculturative stress (prevention).

Depletion of Self-Control

Depletion of self-control emerges as a central concept in understanding impulsive purchasing patterns. Baumeister and Heatherton (1996) as cited in Sultan et al. (2012) present an intriguing metaphor: they describe self-control like a muscle that fatigues with use: "in the short run, self-regulatory resources can become consumed as a result of closely sequenced acts of self-control". Just as a tired muscle struggles to perform, depleted willpower leaves us vulnerable to impulse purchases.

This phenomenon is particularly relevant for international students that may experience heightened self-regulatory demands in two keyways. First, adjusting to a new cultural environment requires constant decision-making. Each choice—whether it pertains to food, clothing, or social interactions—draws from the limited reservoir of self-control. I hypothesize that the cognitive demands of learning new shopping norms, deciphering unfamiliar brands, and navigating different pricing structures deplete international students' mental resources, increasing their susceptibility to impulse purchases once they reach the store. Second, international students frequently encounter academic stress, also known as "academic shock" (Sultan et al., 2012), as they adapt to new teaching methods, assessment styles, and linguistic challenges. Academic stress, much like cultural adaptation, can drain self-regulatory resources. This may also bring about depletion of self-control. Oaten and Cheng (2005) as cited in Sultan et al. (2012) point out that "academic stress (brought on by exams) is associated with significant

increases in smoking, eating junk food, and impulsive spending". Given these stressors, it is plausible that international students, struggling with both cultural and academic adjustments, may be particularly prone to spontaneous spending as a coping mechanism.

The Strength Model of Self-Regulation

The strength model of self-regulation builds on the metaphor of self-control being akin to a muscle. Oaten and Cheng (2006a, 2006b) as cited in Sultan et al. (2012) found that when people practiced self-regulation in one area, like sticking to a study schedule or following a budget, their ability to control impulses improved not just in that specific area, but across other parts of their lives too. In other words, self-discipline in one domain can spill over into others.

In consumer behavior, this model highlights both the potential for strengthening self-control and the risks of depletion. Vohs & Faber (2007) showed that when people's self-control was depleted, they were more likely to give in to impulse purchases. Their experiments found that participants who had already exerted self-control—whether by focusing on a mentally taxing task or resisting temptation earlier—ended up spending more money, buying more items on a whim, and paying less attention to whether they actually needed what they were purchasing. Their findings make a strong case for the importance of recharging our self-control and finding ways to build long-term discipline, especially if we want to avoid falling into impulsive spending habits.

Carol Moser's *Impulse Buying: Designing for Self-Control with E-commerce* references Dholakia's (2000) "Consumption Impulse Formation and Enactment" (CIFE) model as "perhaps the most integrated model of impulse buying." While Moser does not apply the model directly to her study, she uses it as a conceptual foundation to organize self-regulation strategies across the six phases of the impulse buying process according to CIFE: pre-stimulus, stimulus, recognizing constraints, deliberation, volition, and feedback. These strategies are mapped to each phase to illustrate where in the impulse buying process different self-control interventions can be most effectively applied. While Moser's research is situated in the context of e-commerce, the CIFE model itself is concerned with the broader process of consumption impulse formation. Thus, I believe the self-regulation strategies she proposes can be meaningfully adapted to the context of unplanned and impulse grocery shopping—especially among international students navigating a new cultural and consumer environment. This phase-based structure informed the design of my own prototype, guiding how specific features were aligned with key moments in the user's decision-making process.

The framework, summarized below, unfolds across six distinct phases—pre-stimulus, stimulus, recognizing-constraints, deliberation, volition, and feedback—each revealing unique aspects of the self-regulation process, and each manifesting in the development and contents of the prototype:

1. **Pre-Stimulus Phase: Preparing for Self-Control:**

    1.1. Goal Setting and Implementation Plans: Establishing clear goals and implementation plans, such as Gollwitzer's (1999) *if-then* strategies, as cited in Moser (2020) help

translate intentions into automatic behaviors, making it easier for us to resist temptations when they arise. For example, *"If I feel tempted to buy something unnecessary, then I will check my budget first."*

1.2. Commitment Devices: External tools can reinforce self-control by making it harder to act impulsively. Commitment devices include strategies such as using cash instead of credit cards, setting spending limits in budgeting apps, or publicly sharing financial goals for accountability. Moser's (2020) research highlights that those who use such mechanisms tend to save more and make fewer unplanned purchases.

1.3. Avoiding Ego Depletion: Prolonged shopping, excessive decision-making, and mental fatigue all reduce the ability to resist impulses. Setting time limits on shopping or avoiding online browsing during stressful periods can help preserve self-control.

2. **Stimulus Phase: Controlling What We See**
Marketing triggers—whether in the form of advertisements, product displays, or promotional offers—activate the desire to buy. At this stage, controlling our exposure to these triggers can reduce susceptibility.

2.1. Avoiding Temptation: Vohs & Faber (2007) found that consumers with depleted self-regulatory resources were more likely to make impulse purchases when exposed to unplanned shopping opportunities. One effective way to counteract this is by limiting exposure to advertising, avoiding retail spaces without a purpose, and unsubscribing

from marketing emails to reduce impulsive urges before they form.

2.2. Shifting Attention: Moser (2020) discusses how directing attention away from the immediate sensory appeal of a product and toward its abstract or long-term benefits can help reduce impulsive decision-making. For instance, rather than focusing on how exciting a purchase feels in the moment, we can reframe it in terms of whether it adds real value to our lives.

3. **Recognizing Constraints: Activating Our Self-Control**

At this stage, we may already feel the pull to buy, but our brain is also evaluating whether any constraints—such as financial limitations or long-term goals—might stop us. Strengthening these constraints can provide a necessary pause before acting on impulse.

3.1. Using Goal Reminders: Research by Oaten and Cheng (2006b) as cited in Sultan et al. (2012) found that subtle reminders of financial objectives—such as a savings goal tracker or a notification from a budgeting app—help reinforce self-discipline. Participants who were primed with savings-related words were less likely to make impulsive purchases than those who were not.

3.2. Creating Barriers to Spending: Commitment devices can also act as constraints at this stage. Moser highlights strategies such as locking savings accounts, setting up automatic transfers to financial goals, or using prepaid debit cards to make impulse spending less convenient. These physical barriers increase the likelihood that we will stop and

reconsider before making a purchase.

4. **Deliberation Phase: Stopping to Think**

If we haven't already walked away, this is the stage where we actively consider whether to complete the purchase. Encouraging deeper reflection at this moment can help prevent impulse-driven decisions. Encouraging deeper reflection at this moment can help prevent impulse-driven decisions. One effective strategy is to make constraints more accessible, such as reminding ourselves of financial goals, upcoming expenses, or past regrets from similar purchases. Budgeting apps, savings trackers, or even a simple question—*"Do I truly need this?"*—can slow down the impulse and shift thinking toward long-term consequences. Another approach is to limit rationalization, as we may justify unplanned purchases by reinterpreting them as necessities. Setting pre-determined decision rules, like waiting 24 hours before buying or sticking to a shopping list, can create a buffer against emotional reasoning. Additionally, commitment devices, such as using cash instead of credit or setting spending alerts, can make it harder to act impulsively. By introducing small barriers and structured decision-making, we can transform the deliberation phase into a moment of self-regulation rather than surrender to impulse.

5. **Volition Phase: Resisting the Urge to Buy**

5.1. Regulating Our Emotions to Reduce Impulse Buying: Since negative emotions often push us toward impulse purchases, managing our mood in healthier ways can help us stay in control. Moser (2020) highlights how instead of using shopping to feel better, we may find other ways to lift our spirits, like listening to upbeat music, going for a walk, or

engaging in a hobby we enjoy. By shifting our focus to positive experiences that don't involve spending, we weaken the emotional pull of impulse buying and reinforce our ability to resist urges.

5.2. Creating Emotional Incompatibility with Impulse Buying: Another way to fight impulse buying at this stage is by intentionally shifting our emotions to make spending feel less appealing. If we feel tempted to buy from a particular store, we can recall a frustrating experience with that brand, like bad customer service or an item that disappointed us. By linking the purchase to a negative feeling, we make it easier to walk away without regret. This simple mental shift helps us override impulse-driven desires and stay focused on our long-term financial goals.

6. **Feedback Phase: Learning from Our Choices**

After an impulse buying episode—whether resisted or acted upon—reflecting on the outcome helps us strengthen self-regulation for future situations. Regardless of whether we make the impulse purchase or successfully resist it, the feedback phase plays a crucial role in shaping our future behaviour. Moser (2020) highlights that paying attention to *how we feel* and *what led to our decision* helps us recognize patterns and adjust our strategies moving forward. A key part of this phase is monitoring our behavior—actively checking whether our spending habits align with our financial goals. Tracking purchases, reviewing budgets, or reflecting on past buying decisions can create self-awareness and act as a natural deterrent against impulse buying. This self-monitoring process not only strengthens our ability to stick to financial plans but also helps us refine our self-regulation strategies. Additionally, seeing

unwanted spending patterns emerge can act as a "mental tax", making us less likely to repeat impulsive behaviors. By consistently assessing our choices, we create a cycle of learning and improvement, making it easier to stay in control of our spending habits.

Methods

Participant Recruitment

Eleven international students from OCAD University were recruited using a convenience sampling approach. Multiple communication channels were leveraged to reach potential participants. Recruitment efforts included a post on my personal Instagram account, an email broadcast and promotional post shared by the International Student Office on their official social media, as well as announcements via the university-affiliated Instagram accounts @myocadu and @ocaducampuslife.

Upon encountering the recruitment post, prospective participants were directed to a screening form designed to assess their eligibility. To be eligible, participants had to be international

students, as the study specifically examined their experiences with unplanned grocery shopping. The age range was set between 18 and 60 to ensure a broad representation within the adult student population. Additionally, participants needed to have familiarity with mobile devices and digital applications to ensure they could effectively engage with the digital prototype. Lastly, they had to confirm their willingness to participate in two user testing sessions, each lasting approximately 90 minutes, allowing for both an initial engagement with the prototype and a follow-up session on refinements.

In total, the recruitment of 11 participants helped capture a diverse range of perspectives, increasing the likelihood of uncovering varied insights into international students' experiences with unplanned grocery shopping.

Participation in the study was entirely voluntary, with all participants informed that their contributions would remain anonymous. Ethical considerations were clearly outlined, including their right to withdraw at any point during the sessions. For the second user testing session, 7 out of the original 11 participants were available and took part, ensuring continuity in feedback while still allowing for the evaluation of refinements made to the prototype.

The study was approved by OCAD University Research and Ethics Board, REB No. 2025-10. The REB application outlined the full scope of the research, including participant eligibility, recruitment strategies, procedures for data collection, and the intended use of findings. To ensure informed and voluntary participation, all participants were asked to review and sign a formal consent form prior to taking part in either session. This form outlined the purpose of the study, what participation entailed, their right to withdraw at any time, and how their data would be kept confidential. Data collection tools—including screen recordings and transcripts—were stored

using secure, institutionally approved platforms such as Microsoft Teams and Microsoft OneDrive. All identifying details were removed during the transcription process. These protocols reflect the care taken to protect participants' rights and privacy, and to ensure that ethical standards were upheld throughout the study.

Research Through Design

Research Through Design (RtD), as my chosen methodology, treated the design process itself as a form of inquiry. It is described as an approach "to conducting scholarly research that employs the methods, practices, and processes of design practice with the intention of generating new knowledge" (Zimmerman & Forlizzi, 2014). RtD is particularly effective for addressing complex, real-world problems because it produces situated knowledge—insights that emerge from specific design contexts rather than from abstract theorization. A few key aspects of Research through Design (RtD) as a methodology were explored through existing literature.

1. One of the fundamental principles of RtD is that design artifacts themselves serve as a form of knowledge. RtD asserts that knowledge is embedded in the designed artifacts themselves, which reflect the framing of the problems, design processes, and research contributions. Artifacts function as both, evidence of inquiry and vehicles for knowledge transfer within research communities (Zimmerman et al., 2007). Within this thesis, the various prototypes created to help international students manage unplanned grocery spending serve as the central design artifacts, and all supporting documents—such as feature explanations or exhibition materials—operate as annotations that clarify and make explicit the knowledge embedded in the prototype.

2. RtD relies on iteration, where each design cycle refines both the artifact and research insights. This iterative approach ensures that RtD research remains dynamic and responsive to real-world complexities rather than being constrained by predefined hypotheses (Zimmerman et al., 2007).

Why RtD was appropriate for this research

RtD allowed me to explore unplanned shopping behaviors by designing and iterating on a prototype rooted in my own experiences as an international student. Early on, I engaged in an auto-ethnographic process, reflecting on the challenges I faced managing unplanned purchases in a new cultural context. This sparked the hypothesis that a digital tool addressing those challenges might also benefit other international students.

The first five prototype iterations (Prototypes 1–5) were developed as part of this auto-ethnographic exploration, shaped by my lived experience, a growing body of literature on self-regulation and impulse buying, and informal conversations with fellow international students. These early versions allowed me to translate my reflections into tangible design concepts and evaluate them against my own behaviors and perceived needs.

Prototypes 6 and 7 marked a shift toward a more user-centered approach, informed by online user testing sessions with other international students. Prototypes 6 and 7 were refined in response to direct feedback on earlier designs, allowing me to observe not only how participants interacted with specific features but also why those features did or did not support their needs.

Ultimately, this iterative RtD process—melding personal insights, literature-based strategies, and participant feedback—revealed how a design artifact can embody and advance knowledge around unplanned and impulse buying in international students.

Prototype 5.0: The First Prototype for User-Testing

Prototype 5.0 marked a significant milestone as the first version formally presented to the initial user testing cohort of 11 participants. While still very much a work-in-progress prototype, this iteration represented the most refined synthesis of my design explorations and engagement with the literature.

The App Onboarding Experience
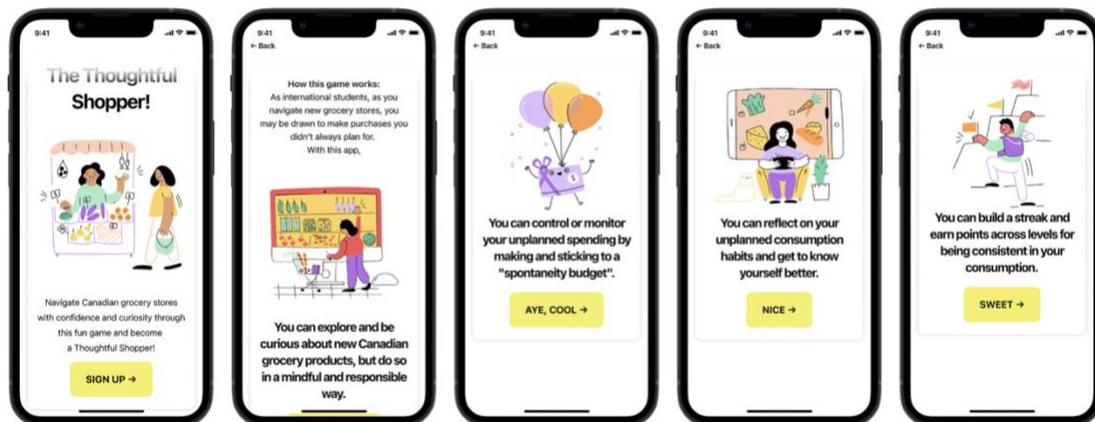
Figure 1 Prototype 5.0: Expanded onboarding process with colorful illustrations from Streamline HQ.

The prototype began with a friendly onboarding process that introduced users to the purpose of the tool: to support international students in managing and reflecting on their unplanned and impulse grocery shopping. As shown in Figure 1, the app's tone was intentionally non-

judgmental and supportive, reinforcing the idea that the app was a learning tool rather than a restrictive budgeting app.

Spontaneity Budget

A central feature introduced in this prototype was the "spontaneity budget"—a weekly estimate of spontaneous purchases that users set during onboarding. Users were asked to anticipate how many spontaneous grocery purchases they might make in the coming week, along with a corresponding monetary budget. This served as a form of intentional pre-commitment and helped frame unplanned purchases as a manageable and expected part of their shopping experience.

Purchase Logging and Feedback
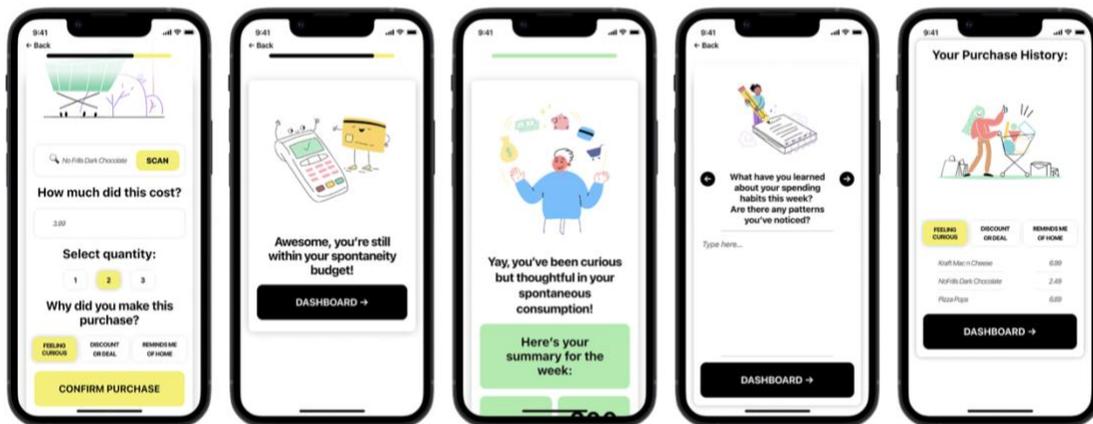
Figure 2 Logging a purchase with cost, quantity, and reason; feedback confirming budget adherence; end-of-the-week spending summary; a journal prompt for reflections; and purchase history categorized by spending motivations.

Via the dashboard that appeared after setting a spontaneity budget, participants could log their unplanned purchases either during or after grocery shopping. Each log allowed them to input the

item, quantity, and the reason for purchase—categorized as "feeling curious," "discount or deal," or "reminds me of home." These categories were designed to encourage self-awareness around spending motivations and to reframe unplanned purchases as meaningful, not merely irrational. At the end of each week, users would receive feedback through success or failure screens, depending on whether they stayed within their spontaneity budget or not. These screens provided structured reflections on their weekly habits without using punitive or guilt-inducing language. A selection of these screens is shown in Figure 2.

Journalling and History

Prototype 5.0 also introduced a journaling section, where users could respond to reflection prompts about their grocery shopping experiences during the week. Additionally, a purchase history section allowed users to view past entries, organized by the motivation behind each purchase. This historical view aimed to help users identify personal patterns and trends over time.

Though not a finished product, Prototype 5.0 stood as the most comprehensive articulation of my own research-driven approach to the problem, setting the foundation for subsequent iterations that would be driven by user feedback and iterative refinement rather than my own independent framing.

My User Testing Protocol, An Iterative Process

Session 1: Focus Group and User Testing

The first focus group and user testing session was exploratory in nature. It sought to uncover broad themes surrounding unplanned and impulse buying behaviors among international students while also introducing the prototype (Prototype 5.0) in its initial form. This session followed a structured format:

1. An initial discussion on shopping behaviors including their motivations for unplanned purchases, the financial and emotional implications of such decisions and any strategies they currently used to manage them,

2. an interactive exploration of the prototype, and

3. a feedback discussion to gather insights on usability and engagement.

Participants were given time to explore the prototype independently. This phase allowed for direct observations of usability, navigation challenges, and initial reactions to core functionalities. The session concluded with a structured feedback discussion, where participants shared their experiences using the tool.

This session helped identify both strengths and areas for improvement, particularly regarding the usability of certain features and the overall engagement level of the tool. Beyond feedback on the prototype itself, this session also provided deeper insights into international students' financial decision-making processes. These insights were instrumental in shaping the direction of subsequent prototype development.

Session 2: User Testing

The second user testing session was undertaken after Prototype 6.0 was designed in response to the first user testing session. With the research participants already familiar with the tool, this session primarily focussed on major usability improvements and design refinements. It began with a summary of feedback and updates, a revised prototype testing phase, and a final discussion on usability, engagement and features that could be added in the future. Participants were first given a summary of the feedback gathered from the previous session and an overview of the changes made in response. Participants then interacted with the revised prototype, with particular attention paid to any adjustments in user flow, new and improved features/ sections, and overall engagement. During this process, participants were provided with a structured set of tasks to explore specific features of the app, including:

1. Logging a purchase successfully and unsuccessfully to test how the system responded in both scenarios.
2. Exploring the revised Journaling and History sections to assess usability.
3. Navigating the Dashboard to interact with key sections such as the "Nearby" feature, shopping guides, and help sections.

This session aimed to test whether the tool had become more intuitive and whether the added refinements—such as the redesigned spontaneity budget setting options and improved reflection prompts—enhanced its effectiveness. The feedback discussion in this round focused on fine-tuning details, suggesting user interface and experience (UI/UX) improvements, identifying usability issues, and potential new features that could be developed in future iterations. This final

user testing session informed the design of the final prototype, Prototype 7.0.

Iteration Informed by The Design Thinking Framework
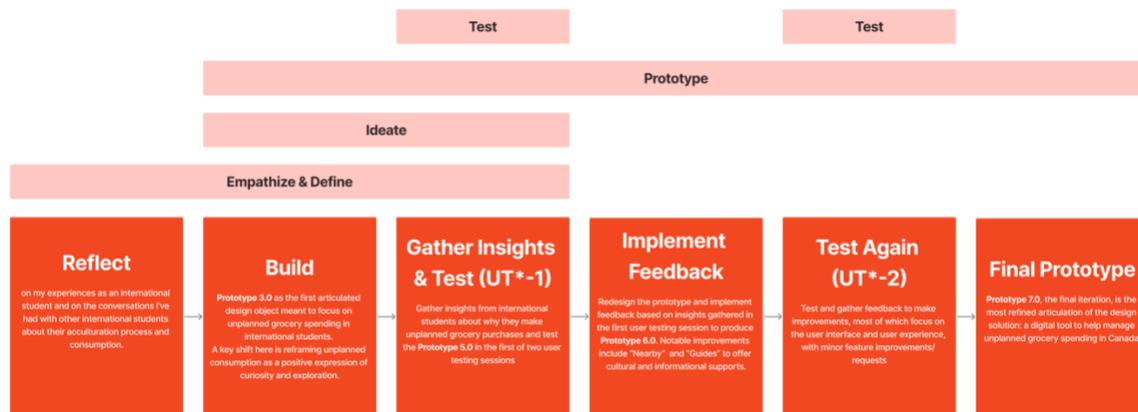
Figure 3 User testing protocol outlining the iterative design process, mapped against the Design Thinking Framework.

The "Design Thinking" framework pioneered by Hasso Plattner Institute of Design at Stanford University is one I found particularly relevant to my research. It's application to my user testing protocol is shown above in Figure 3. Design thinking is a non-linear, iterative process grounded in empathy and user-centric problem-solving involving the following steps (though not in a strict order): empathize, define, ideate, prototype and test. What's important is that these aren't watertight steps and the boundaries between them may often blur as they borrow from and loop back into other steps to further the design process:

1. Empathize: This stage involves understanding users' needs through qualitative research. For my study, this meant exploring the lived experiences of international students and identifying the emotional, cultural, and financial factors influencing their unplanned shopping habits.

2. Define: Alongside gathering insights, I synthesized the data to articulate clearer problem statements. Defining the core issues helped focus the design of the prototype towards specific challenges that emerged as most pertinent to international students.

3. Ideate: I brainstormed potential solutions without constraints, allowing creative ideas to emerge. A part of this process also occurred during the two user testing sessions, with feedback on potential features and design elements from participants helping produce new ideas and features that could be developed further. This phase was crucial for identifying features that could support self-regulation, such as spending trackers or reflective prompts.

4. Prototype: I developed an initial prototype as a tool for learning and conducting research through design. Prototyping helped translate abstract ideas into tangible features that could be tested with participants and refined.

5. Test (and troubleshoot): As part of the process, I conducted two user testing sessions with international students, gathering feedback to identify what worked, what didn't, and how the design could be improved.

Qualitative Data Analysis

The Process

The data collected from the user testing sessions was analyzed using qualitative thematic analysis, following an inductive approach. This method was chosen to allow patterns and themes

to emerge organically from the data. By focusing on participant experiences, perceptions, and interactions with the digital prototype, the analysis aimed to answer the study's core research questions. To facilitate a structured approach to data interpretation, I relied on screen recordings and transcriptions captured via institutionally approved secure software (Microsoft Teams). The transcripts were then systematically coded using *Qualcoder (Version 3.6)*, an open-source qualitative data analysis software.

Coding Process and Thematic Development

The analysis began with an initial round of open coding, where descriptive labels were applied to segments of text that were relevant to the research questions. This resulted in a code count total of 228, across 27 overlapping code categories, as shown below in Figure 4. They captured a broad range of experiences, behaviors, and perspectives related to unplanned grocery shopping. The codes were then examined for redundancies, grouped into broader categories, and refined into thematic clusters.

The coding process followed these steps:

1. Open Coding: Identifying meaningful excerpts from participant transcripts and assigning them descriptive labels (e.g., *"buying due to home connection," "curiosity," "deal/discount," "seeking convenience"*).

2. Pattern Identification: Reviewing the codes for repetitive or overlapping ideas and conceptual similarities.

3. Thematic Organization: Grouping codes into broader thematic categories aligned with the research questions.

Name	Memo	Count
budetary adherence		9
bug/ error		1
buy small qty first		5
buying due to home connection		5
can be improved (design)		32
causes of unplanned shopping		13
curiosity		21
deal/ discount		10
edible/ non-edible shopping		6
emotion		3
improvement!		4
learning as an int student		7
loyalty program		1
making unplanned purchases		3
matters to international students		10
meal prep/ shopping prep		8
online ordering		8
possible new feature?		7
price-sensitivity		4
proximity to store		3
seeking convenience		12
shopping behaviour		29
shopping in bulk		5
store atmosphere		6
strategy to avoid unplanned shopping		11
wanting to save money		4
what is purchased		1

Figure 4 Qualitative Data Analysis Codes in Qualcoder. The screenshot displays codes, and their frequency counts generated during qualitative data analysis using Qualcoder software. Screenshot taken by the author.

These codes were clustered into broader thematic categories. While some of these factors may not be exclusive to international students, their frequency in participant responses suggests that they are particularly important to this demographic.

Results

Themes Emerging from the Focus Groups

The thematic coding of transcripts from the first focus group and user testing session revealed important insights into the key decision-making factors that influence grocery shopping among international students. These factors may not be unique to international students alone; however, they emerged as playing an important role in their decision-making process, nonetheless.

Causes of Unplanned and Impulse Spending

Curiosity and Exploration

Coded 20 times over, the most frequently cited cause of unplanned and spontaneous purchases was curiosity, with all 11 participants expressing a desire to try new foods, explore unfamiliar brands, or engage with local grocery options. This finding suggests that unplanned buying is often driven by a sense of discovery rather than pure necessity.

Price Sensitivity, Deals and Discounts

Price sensitivity played a central role in shaping international students' grocery shopping behavior. Codes such as "budgetary adherence," "deal-seeking," "price sensitivity," and "wanting to save money" reflected a shared concern with managing limited budgets. These codes illustrated how students aimed to stay within financial limits while still allowing space for occasional impulse purchases—often tied to perceived savings. The code "deal/discount" appeared 10 times across the focus group and user testing session, with insights from five participants pointing to the influence of price promotions and bulk deals on unplanned purchases. One participant mentioned buying in bulk due to promotions or in-store reward points, even when the items weren't urgently needed. Another described actively seeking out deals as part of their regular grocery routine. Together, these findings suggest that unplanned purchases among international students often occur within the logic of budget-consciousness—not as lapses in control, but as intentional responses to perceived savings. Promotions and discounts, rather than purely triggering impulsivity, were often used strategically to stretch limited budgets.

Buying Due to a Connection to Home

Coded four times over, three participants described purchasing products that reminded them of home, driven by emotional and nostalgic ties. One participant specifically noted that, while they do not regularly cook their home country's cuisine, they occasionally made impulse purchases of familiar products out of a sense of connection.

Strategies to Avoid Unplanned Spending

Although unplanned purchases were a common experience, students also employed intentional strategies to regulate their spending. Strategies to Avoid Unplanned Spending was coded 11 times and revealed a range of self-imposed techniques used to limit impulse buying.

Meal Prep and Grocery Planning

This was coded eight times across six participants. Participants engaged in meal planning and the preparation of a shopping list to minimize unnecessary spending. This strategy helped them stay focused on essential purchases and reduce susceptibility to in-store promotions.

Online Ordering as a Control Mechanism

Although in-store shopping remained the primary mode of grocery shopping, five participants described turning to online grocery shopping as a deliberate self-management strategy to help control unplanned spending. Participants shared that shopping online reduced their exposure to in-store triggers—such as promotional displays or strategically placed products—and allowed them to stick more closely to a pre-determined list. One participant noted that online platforms

make it easy to view and repeat past orders, which helped them avoid browsing or feeling tempted to explore new or unnecessary items. This made it easier for participants—particularly those managing tight budgets—to make intentional, goal-aligned decisions and reduce the likelihood of exploratory impulse purchases.

Shopping Behaviours and Purchase Patterns

Shopping behaviour was coded over 30 times, capturing the varied shopping behaviors international students engage in, particularly in relation to unplanned purchases. The findings suggest that shopping behaviors are highly adaptive, influenced by both personal preferences and external conditions. Four participants reflected on how their shopping habits had evolved since moving to Canada. They expressed an unfamiliarity about prices and how expensive products might seem at first. Since then, they adapted their spending behaviors based on their own learnings and experiences navigating Toronto's retail landscape, learning to budget more effectively, compare prices, and take advantage of deals strategically – leading to unplanned spending.

Trial-Based Buying

Three participants described buying in small quantities when trying a new product for the first time. This behavior reflects an approach to unplanned grocery shopping where purchases are made with minimal financial risk in case the product does not meet expectations.

Convenience, Store Proximity, and Bulk Buying Patterns

Convenience and proximity to grocery stores emerged as significant factors shaping international students' shopping behaviors. The code "seeking convenience" appeared 11 times, reflecting how decisions around where and when to shop were often driven by time constraints, physical access, and a desire to avoid frequent trips. "Proximity to the store" was also coded twice, with students emphasizing the importance of having accessible grocery options within walking distance or on familiar transit routes. Five participants indicated that they purchased groceries in bulk to manage such logistical challenges. This behavior was often driven by a desire to reduce the frequency of shopping trips or to save time in the long run. One participant specifically noted that when visiting a specialty or ethnic grocery store that carried items from their home country, they tended to buy more than they had originally planned. Because the store was far away and not easily accessible, they felt justified in purchasing extra items during each visit, knowing they were unlikely to return soon. In this case, bulk buying—though unplanned—was a practical response to the distance and limited accessibility of the store.

Edible vs Non-Edible Purchases

Five participants noted that their unplanned shopping behavior varied depending on the type of product. While unplanned food purchases were often driven by emotional or cultural motivations, non-edible purchases (e.g., household supplies, toiletries) were typically more practical and need-based.

Feedback on Prototypes 5.0 and 6.0

Prototype 6.0: A User-Centered Redesign

Prototype 6.0 marked the first major iteration built entirely around user feedback, incorporating extensive insights from the first user testing and focus group session. This version responded directly to participants' comments on the usability, emotional tone, and clarity of the tool, resulting in significant visual, functional, and content-based revisions.

Revised Journalling, History and Improved Personalization
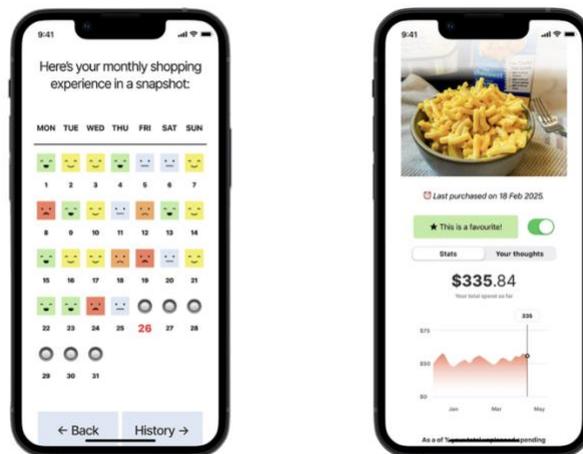
Figure 5 Screens from the app prototype showing a mood-based calendar view of monthly shopping experiences (left) and a detailed product history view with spending insights (right).

Participants expressed hesitation about typing out their thoughts after each purchase, noting that it felt time-consuming and unrealistic for daily use. As one participant put it, *"It's like a typing thing... I don't think people would sit and type. I would change it to like emojis or like... a happy face, an extremely happy face or a sad face."* This was echoed by another participant, and in response to this feedback, Prototype 6.0 introduced emoji-based journaling prompts, as shown in

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Figure 5, offering users a quicker, more intuitive way to track their emotional responses to purchases. Additionally, one participant noted that they wanted a more granular level of reflection—not just on overall spending, but on specific items: *"There should be a part that says like, OK, these are the things that I bought unexpectedly, and it ended up liking or not liking just so it's like a reflection I have."* Another participant shared, *"If there could be a like, we can click a star mark or something… that would be nice,"* suggesting the ability to mark items as favorites. This insight led to improvements in the History and Journaling section, which gave users the ability to favourite, reflect on and track spending across individual products.

Data Visualization and Progress Tracking
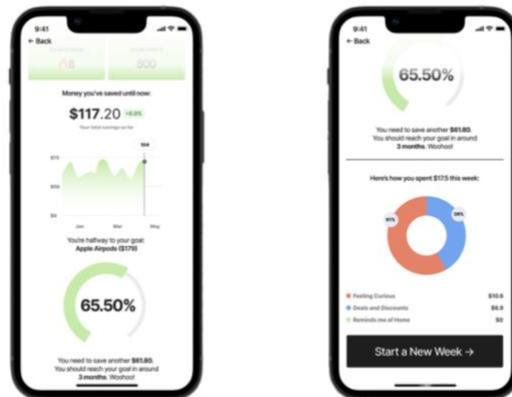
Figure 6 Screens from the app prototype showing data visualization and progress tracking related to savings goals and weekly spending insights.

Participants also expressed a desire for more visual, tangible representations of their progress. One noted, *"I was wishing that instead of seeing the budget that I've spent, I would see the budget or the money that I've saved... and to see like a growth of my points from Week 1 to Week 2 to Week 3... like a growth pattern or fluctuation."* Another participant expressed how visually seeing their data is *"a much more palpable way to see things."* These insights led to the

development and integration of data visualization, as shown in Figure 6, not just in the case of money saved each week, but also for other budgetary aspects such as the spontaneity budget left, money spent so far on individual products within the History and Journalling section, etc.

Improved Budget Settings, Feedback and Alerts
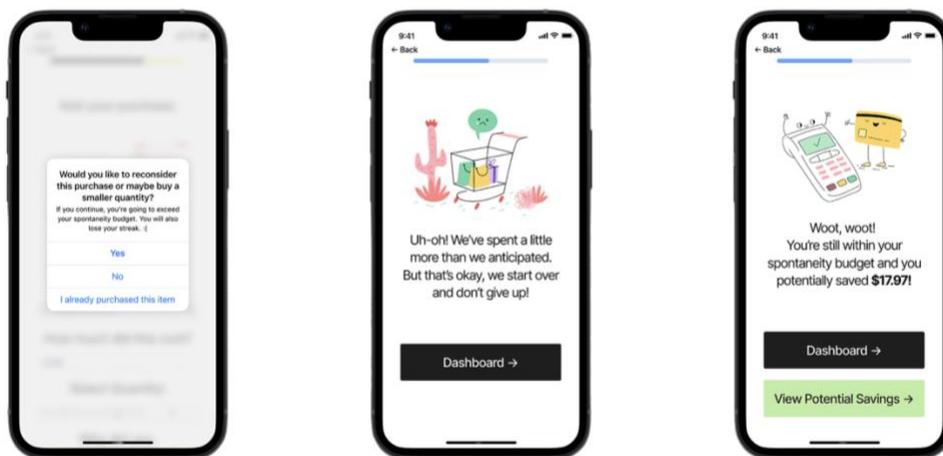
Figure 7 Screens from the app prototype showing user feedback prompts and budget tracking outcomes based on spending behavior.

In Prototype 6.0, users could choose to set their spontaneity budget based on how much money they might spend, with the option to also specify how many purchases they might make. This was in response to three participants expressing that they were more concerned with money spent rather than the number of items purchased. Additionally, a new early-warning feature was introduced to notify users when a selected item would exceed their pre-set spontaneity budget. This change was in direct response to a participant who said, *"I was expecting that if I selected like an amount that would put me above my budget, it would kind of give me a warning."* The goal was to shift the feedback earlier in the decision-making process, as shown in Figure 7, nudging and helping users pause before confirming a purchase, rather than only reflecting

afterwards.

External Goals as an Incentive

Prototype 6.0 allowed users to set an external goal, such as an item or financial goal they could save towards. This suggestion came from a participant who found value in how the tool might help save money: *"I was thinking like if I set a goal where, like, OK, I want to buy probably a PlayStation... and I can save up money by purchasing less... That could be a good way to incentivize."*

A "Nearby" Section and Helpful Guides

While some additions were based on direct participant feedback, others were introduced in response to my observations as a researcher, particularly during the focus group discussions and user testing walkthroughs. While not explicitly requested, this responded to observations I made that international students actively seek products from their home countries or cultures but often struggle to find or access them. For example, one participant expressed *"When I went to like the Arabic store 'cause it's further away, I just kind of like, if I find something that I want, then I'll just take it unplanned 'cause I don't really know what to expect or what to find there... And for me, that's very exciting... I end up getting more things to try because it's from my home country or like my culture."* Similarly, observing the conversation around unfamiliarity in the initial stages of being in Canada, a "Shopping Guides" section was introduced, offering onboarding materials like "What to Know Before Grocery Shopping in Canada" and "Canadian Grocery Stores," designed to help newcomers navigate unfamiliar retail environments with greater confidence.

Visual Redesign

While no participant directly requested a redesign, I observed that some users took time to interpret screen layouts or overlooked key features. To further reduce cognitive load and improve usability, I undertook a visual redesign of the interface, borrowing visual elements from standard mobile user interfaces that users might find familiar. I also used colour in a connotative sense when setting the spontaneity budget to quickly guide the user through the process visually: green for positive actions and favourable settings, blue for neutral, yellow for warnings and red for higher spends. Redesigned screens, nudges, Nearby and Shopping Guide features from Prototype 6.0 are shown below in Figures 8 and respectively.
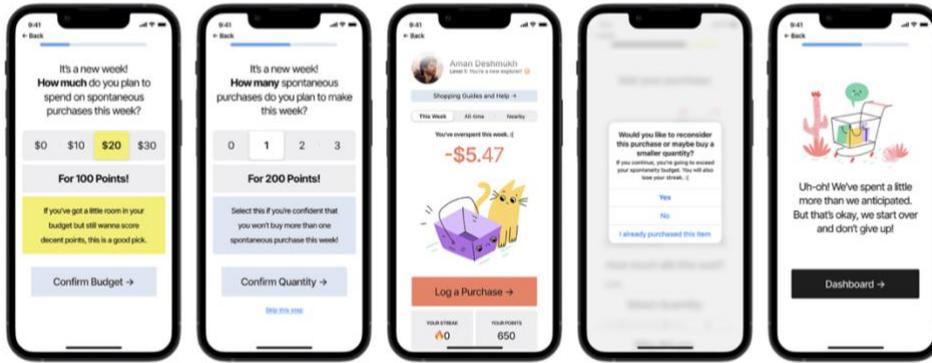
Figure 8 Redesigned screens for setting the spontaneity budget; redesigned dashboard showing an overspent budget; a warning nudge when about to exceed the budget; and final confirmation after exceeding the budget.
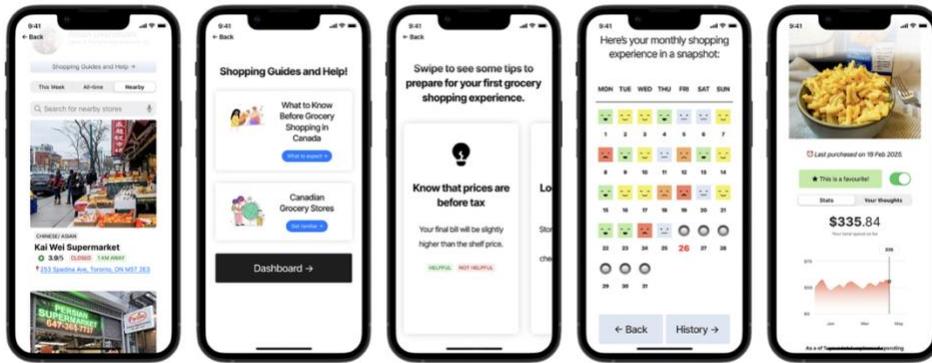
Figure 9 Nearby grocery stores section; shopping guides; first-time grocery trip guide; emoji-based shopping journal; and product reflection page.

Prototype 7.0: A Final Optimized Design

Prototype 7.0 was developed in direct response to feedback from the second round of user testing, addressing key concerns around visual hierarchy, budgeting feedback and across-the-board usability refinements. The primary focus of participant suggestions in this session was on user interface (UI) refinements, usability improvements, and potential feature enhancements.

UI/ UX Improvements

Sticky Navigation Bar

A structural change in Prototype 7.0 was the introduction of a sticky bottom navigation bar, designed to improve overall app navigation and reduce user confusion around the different sections within the app. This revision was introduced in response to participant feedback that navigating between sections—especially Dashboard, History, and Journaling—required excessive scrolling and felt unintuitive. As one participant explained, *"I think this could benefit from just like one—like a navigational bar at the bottom where all like the dashboard and the history and journaling could be like 3 different sections, so it's easier to switch between each instead of having to scroll all the way down."* This suggestion was reinforced by another participant during the session.

In response, the updated navigation grouped four key areas—Dashboard, Nearby, Journal & History, and Guides & Help—into a persistent bottom nav bar. This gave users faster, more predictable access to core sections of the app, improving usability and aligning with common mobile interface patterns.
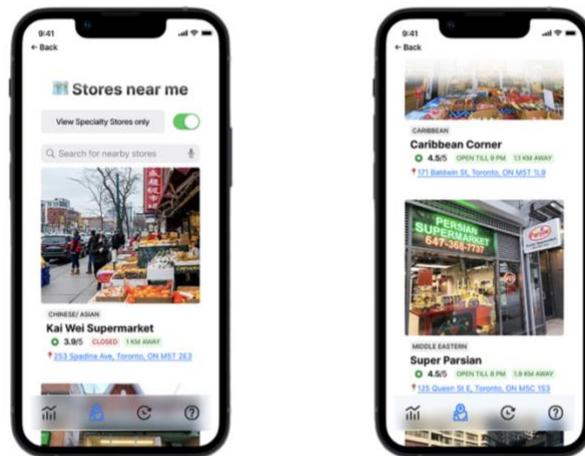
Figure 10 Screens from the app prototype showing specialty grocery store listings in the "Nearby" section, filtered to highlight culturally relevant shopping options. The Sticky Nav bar can be seen at the bottom.

The "Nearby" section was also restructured in Prototype 7.0, largely in response to confusion and suggestions expressed by four participants regarding both its placement and functionality. While users appreciated the intent behind the feature—to help them locate general and specialty grocery stores—they consistently found its position on the dashboard, grouped alongside time-based metrics like "This Week" and "All Time," to be conceptually confusing.

One participant noted, *"'This Week' and 'All Time' makes sense because it's like time, but 'Nearby' is something completely different from both of these two."* Another said, *"When I see it for the first time, I don't know what 'Nearby' is... so maybe it can be placed somewhere else on the screen."* Others described it as "misplaced," with one participant suggesting it might sit better within the shopping guide: *"The 'Nearby' seems a little like misplaced and it could actually sit well within the shopping guide… you also have other grocery stores listed in that, so it could be another category of nearby grocery stores also."* In response, the Nearby section was removed from the dashboard and relocated to the sticky bottom navigation bar, separating it from

time-based categories on the Dashboard like "This Week" and "All Time".

Functionality was also expanded to address another common point of confusion. One participant explained, *"If I'm new here I would look for a tab for all the shops and then in this section I would look for what is specific to my… culture."* Another participant added, *"If I search 'Nearby' and it's all like… culture supermarkets… I would be a little bit confused at first."* A solution that emerged that of a toggle to filter stores would improve the experience. As that participant put it, *"So I feel like it would be nice if I could filter—so like local versus culture."* In response, Prototype 7.0 introduced a toggle within the Nearby section, as shown in Figure 10, allowing users to switch between general grocery stores and specialty or ethnic stores. This provided flexibility for routine shopping and cultural-specific needs, addressing both functional clarity and practical relevance.

Visual Improvements (Use of Illustrations and Colour, Improved Warning Nudges)

One key design focus was the dominant placement and scale of illustrations on the dashboard. Three participants noted that the large visual elements pushed more critical information—such as points, streaks, and budget progress—further down the screen. As one participant put it, *"Because of the illustration being in the center of the focus, the streak and the points that I should ideally be able to see… get (in the way of) the scroll."* Others echoed this sentiment, adding that if illustrations remained static or repeated, they shouldn't be the first thing users see: *"They do take up like a big hierarchy of the screen… your main focus should be on like the actual data."* In response, the size and placement of illustrations were reduced to prioritize

spending insights and budget feedback more prominently on the screen.

Participants also provided valuable feedback on the app's use of color during the budget-setting process. Two participants expressed concern that the colour red, when shown as users were still setting their spontaneity budget, could create a sense of judgment or limitation. Instead, participants suggested reserving connotative color use (such as red for overspending) until after a user had committed to a budget and gone beyond it. One participant explained, *"If I set my budget… and if I try to exceed $20, then it should turn red, not before I set my budget."* This prompted a revision in Prototype 7.0: the color palette during budget setup was neutralized, with red and green cues used only in post-budget feedback to support reflection without biasing the initial experience.

Another area of visual refinement involved budget alerts. Three participants felt that the pop-up warnings used when exceeding the spontaneity budget looked too much like system-level alerts on a smartphone, which created confusion and felt out of place. One participant noted, *"When I see something like this, I think of a warning like on my phone, like something's wrong with the system."* Others suggested using a more integrated approach, such as a subtle pop-in from the bottom or an illustration-based alert that aligned with the app's overall tone. Prototype 7.0 responded by revising the alert style to feel more native to the app interface—less intrusive, but still effective in prompting user awareness.

Together, these changes helped ensure that visual elements across the prototype were not only consistent but also meaningful—supporting user decision-making rather than distracting from it.

Clarity and Readability

A particularly insightful observation from one participant highlighted how the app's pricing display unintentionally mimicked psychological pricing tactics commonly used in retail environments. They pointed out that displaying prices like $6.99—with the cents in smaller font or less emphasis—can give a misleading impression of cost. *"Because you bolded the first part of the price and the second part was not bold… it's a marketing trick—they put it small, even smaller… 99 smaller than the 12,"* they explained. The participant also noted that prices ending in .99 are often perceived as lower than they truly are, adding, *"You're not going to pay $6.50 or $6, you're paying almost $7."* In response, Prototype 7.0 revised the formatting of all prices to avoid this issue. Cent values were visually standardized to match dollar amounts in size and weight, and totals were rounded up where appropriate to reinforce accurate perception of cost. While the suggestion came from a single user, it prompted a meaningful design change— aligning the interface more closely with the app's broader aim of supporting thoughtful and transparent spending decisions.
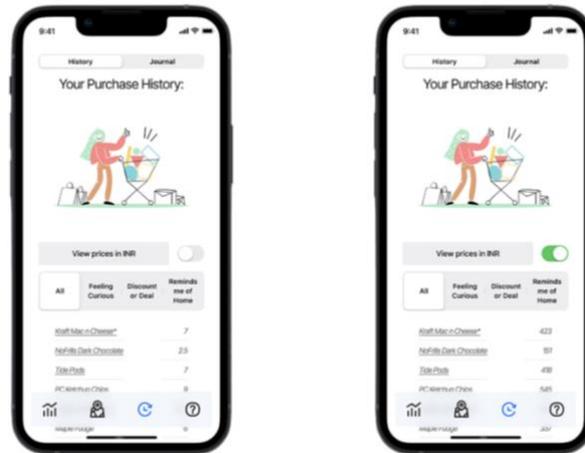
Figure 11 Screens from the app prototype showing a currency conversion feature within the Purchase History section, allowing users to toggle prices between Canadian dollars and one's home currency, in this case Indian rupees (INR).

Five participants raised a request to be able to convert currencies displayed within the app, framing it as especially valuable during the initial transition period after arriving in Canada, when currency familiarity is low, and budgeting feels particularly precarious.

One participant shared, *"When I first came, I would convert everything… I would literally just try and sometimes if I find… tea for example, I would buy it in Qatar for like 5 dollars. Here I'd get it for like the equivalent of like $20, which I thought would be insane."* This kind of comparison, though informal, helped participants assess whether a product was worth purchasing based on familiar pricing standards. Others framed currency conversion as a budgeting support tool. As one participant explained, *"This can be useful not just for comparing prices… It's useful because we have money that we bring from our countries or ask our families to send us. We can calculate, OK, I need this amount per month just for groceries."* In this way, the feature served not just as a momentary conversion aid but as part of a broader effort to plan and manage

finances more effectively. In response, Prototype 7.0 introduced a currency conversion toggle within the History section, allowing users to switch between Canadian dollars (CAD) and their selected home currency (as seen in Figure 11). While not intended to offer precise real-time exchange data, the toggle provided a flexible tool for orientation and budgeting during students' early stages of adjustment. A collection of these prototype features described above are shown below in Figure 12.
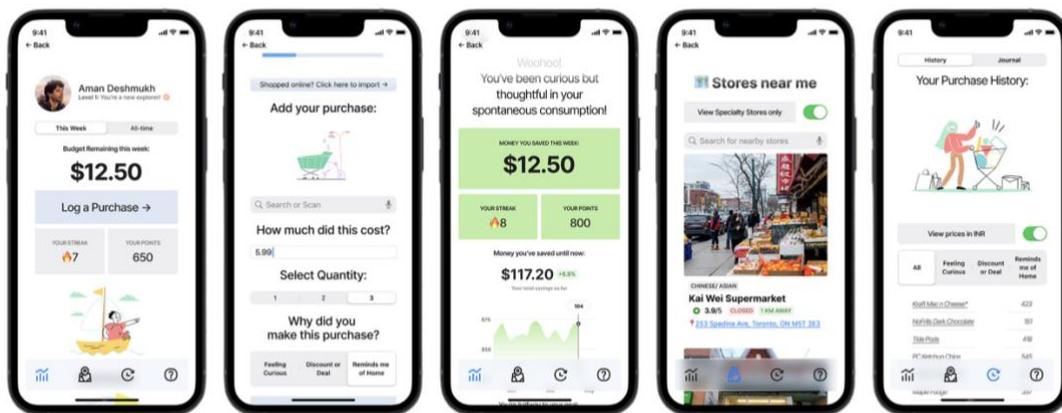
Figure 12 From L to R: The revised Dashboard with the sticky nav-bar at the bottom, purchase logging, the new Nearby section with an option to toggle general and specialty stores, and the combined History and Journal section with an option to toggle currency.

The Exhibition: The Thoughtful Explorer

The central piece of the exhibition was a short video essay projected on the main screen, documenting a walk-through of a typical grocery store from the perspective of an international student. Interwoven with observational footage were text-based reflections, highlighting the emotional and practical decisions international students make—balancing exploration, familiarity, and budgeting.

Figure 13 The video aimed to convey the layered experience of grocery shopping not just as a transactional act, but as one embedded in emotional and cultural considerations. It drew attention to common decision-making factors for international students.

The video, shown in Figure 13, aimed to convey the layered experience of grocery shopping not just as a transactional act, but as one embedded in emotional, cultural, and logistical considerations. It drew attention to common decision-making factors for international students, including curiosity, convenience, unfamiliar pricing structures, and the emotional pull of finding products from your home country.

On the other end of the exhibition space, a video walkthrough of the app demonstrated how insights from the research translated into an interactive financial tool.
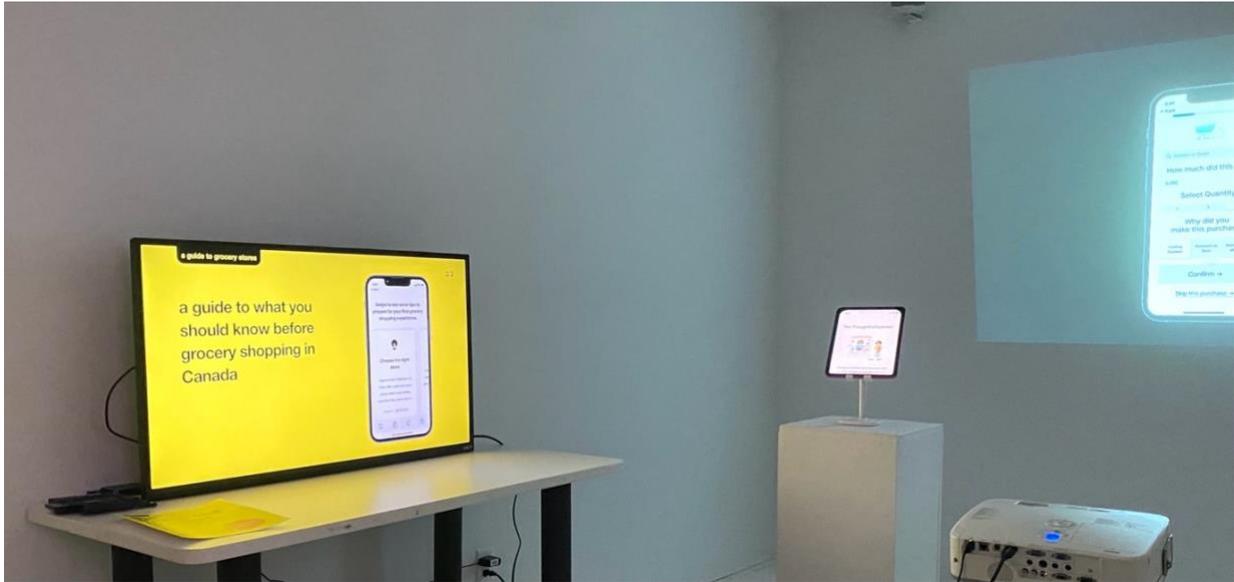
Figure 14 An interactive section of the exhibit featuring a video highlighting the app's features, an app walkthrough and an iPad for visitors to test out the prototype on.

Visitors could test the prototype running on an iPhone and iPads as shown in Figure 14 and 15, giving them the opportunity to interact with the tool firsthand and imagine what using it in their daily lives might be like.
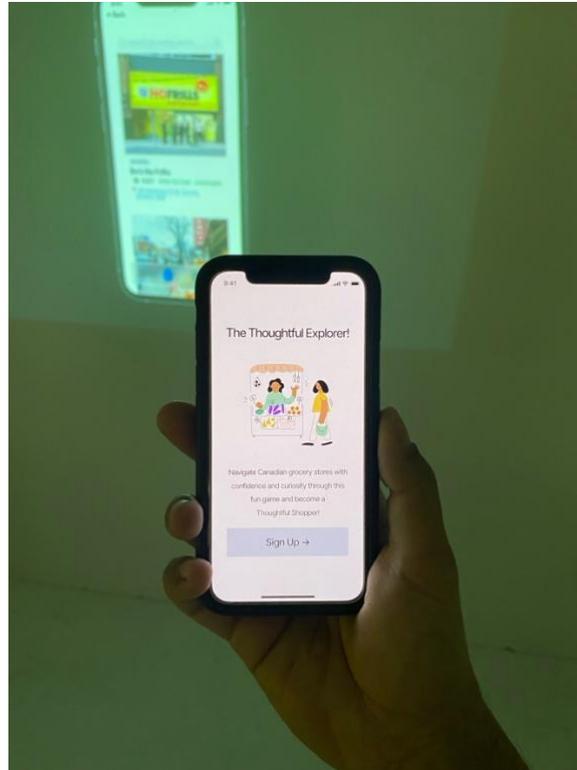
Figure 15 A visitor interacting with the app prototype on an iPhone during the exhibition. The screen displays the onboarding page titled 'The Thoughtful Explorer,' while a projected version of the app interface is visible in the background.

A key aspect of the exhibition's visual identity was its deliberate use of the "No Name" brand identity—a budget grocery brand in Canada popular with price sensitive customers such as international students, known for its instantly recognizable design of black text on yellow backgrounds. This minimalist yet bold style, often infused with self-referential humor, was applied to all displayed media, including research questions, participant quotes, and app descriptions. This intentional design choice made the exhibition visually reminiscent of a grocery store from a distance, evoking a sense of familiarity one might experience in a No Name store. By framing the experience in a familiar visual language, the exhibition encouraged reflection on the relationship between branding, financial consciousness, and everyday spending behaviors. Several international student visitors expressed that certain sections of the video resonated with their own lived experiences, especially in the early months of adjusting to a new consumer

environment. Interestingly, many other visitors—though not international students themselves—noted that they would find a tool like the one developed in this thesis helpful. Their responses pointed to the broader relevance of the themes explored in the project, such as financial self-regulation, emotional spending, and the tension between convenience and budgeting. Throughout the week, I had conversations with visitors about my design and thinking process, as well as the user testing phases that informed the evolution of the prototype. These discussions opened up reflections not just on the final product, but on the value of design research as a method of inquiry. It also made me recognize the value of using lived experience as a starting point for designing more empathetic, adaptive tools.

Discussion

Initial Explorations

My research journey began as an inquiry into consumerism and the ways in which branding, advertising, and design practices make material acquisition frictionless and appealing. However, as I reflected on my own experiences, I shifted my focus to a more specific and personally relevant investigation: grocery shopping as an international student. Through self-observation and documentation, I identified unplanned grocery shopping as a key behavioral pattern, one that is impacted by how grocery stores are designed to encourage excess consumption despite a shopper's budgeting intentions.

Early iterations implicitly treated unplanned purchases as financial missteps, reinforcing a restrictive approach to spending. However, as I synthesized insights from existing literature and personal reflection, I began to reframe unplanned purchases not as failures of self-regulation, but as expressions of curiosity and opportunities for exploration. For international students, unplanned purchases often reflected an attempt to familiarize themselves with a new retail landscape, rather than impulsive or irrational spending. By shifting the tool's core philosophy from restriction to exploration, I hoped to position the tool as an intervention that did not dictate behavior, but rather one that facilitated mindful decision-making, intended to allow international students to develop a healthier, more intentional relationship with consumption.

Narrative Insights that Emerged from the Focus Group and User Testing Sessions

Through the focus group and user testing sessions, I found that unplanned grocery purchases among international students at OCAD University are shaped by curiosity, financial considerations, practical constraints such as proximity, and cultural connection. While these purchases are often seen as impulsive and unplanned, they appear to be part of a structured learning process, influenced by students' evolving familiarity with the grocery shopping landscape in Canada. These insights offer a perspective on how international students adapt their consumer behavior in response to both internal motivations (such as curiosity) and external constraints (such as deals and discounts). These insights also informed the iterative development of a tool that can support international students navigate unplanned and impulse grocery purchases in Canada.

Curiosity and Price-based Decision Making

Impulse buying theory suggests that spontaneous purchases are often driven by novelty-seeking and sensation-seeking impulses (Whiteside and Lynam, 2001 as cited in Chow, 2020). The findings from user testing align with this notion, as all international students frequently expressed a willingness to explore novel experiences in the form of unfamiliar brands, products, and food items. However, while curiosity may initially attract them to a product, price sensitivity remains the deciding factor in whether they follow through with the purchase.

This aligns with research on financial self-regulation, which suggests that impulse buying is not always an unbridled act of indulgence but rather a calculated decision that balances desire with financial limitations (Moser, 2020). For international students, the unfamiliarity with local

pricing structures means that unplanned purchases can serve as a learning mechanism—a trial-and-error process that stabilizes over time. Three participants described a strategy of buying smaller quantities of new or untested products first before committing to bulk purchases – a strategy that other participants also expressed familiarity with. This behavior reflects an effort to minimize financial risk while allowing for exploration, demonstrating that unplanned spending is not purely impulsive but often involves a form of strategic risk management. This approach may not be unique to international students, but it is one they employ to navigate unfamiliar brands and products.

Shifts in Unplanned and Impulse Spending Over Time

The findings suggest that unplanned purchases evolve as students gain familiarity with their new grocery shopping environment. Early in their arrival to Canada, students explore grocery stores more extensively, spending time understanding product options and pricing structures. Over time, this process shifts toward a more strategic approach, where students prioritize discounts, bulk-buying opportunities, and price comparisons.

This transition supports self-regulation theory, which describes how individuals develop strategies to control impulsive behavior as they gain experience and cognitive resources (Verplanken & Sato, 2011). The shift from exploration-driven spending to strategic buying underscores how unplanned purchases initially serve a psychological need for novelty and adaptation before also becoming an economic and logistical strategy for managing time and financial constraints.

Cultural and Emotional Connection

Grocery shopping is not just about sustenance—it also serves as an emotional and cultural touchpoint for international students. Participants reported making unplanned purchases when encountering familiar products from their home countries, aligning with research on nostalgia-driven consumption (Hua et al., 2023). The act of purchasing these items can be understood as a way of reinforcing cultural identity and alleviating acculturative stress, which aligns with previous findings that international students often rely on comfort foods as a coping mechanism (Kalose, 2019). Furthermore, curiosity-driven purchases extended beyond home-country products to include international foods outside of students' own cultures. This indicates that unplanned spending is not always a response to impulse but can also function as a means of cultural exploration and social integration. This, I believe, adds a new dimension to impulse buying research, as it highlights the role of unplanned purchases in cross-cultural engagement among international students.

Minimizing Exposure to In-Store Temptations

Participants recognized that spending more time in a grocery store increases the likelihood of unplanned purchases. For example, five participants highlighted that they turned to online grocery shopping as a method of self-regulation, allowing them to stick to a pre-determined shopping list and avoid distractions. This aligns with existing literature that positions digital tools as potential commitment devices: self-imposed arrangements that compel individuals to stay aligned with their goals by limiting future, goal-inconsistent choices (Moser, 2020). Additionally, four participants mentioned using a simple shopping checklist, and others employed creative techniques such as limiting the amount they could physically carry or even

avoiding wearing spectacles to reduce exposure to promotional banners. These findings suggest that international students are not passive consumers but rather active agents in managing their spending behavior, employing unique self-regulation strategies to navigate retail environments.

How Practical Constraints Shape Grocery Spending

Managing grocery shopping alongside academic responsibilities and part-time jobs makes convenience a key priority for international students. The findings indicate that proximity to the store plays a crucial role in shaping purchasing behavior. As one participant explained, specialty grocery stores that stock home-country products are often farther away, leading to infrequent visits and a higher likelihood of unplanned purchases when the opportunity arises.

This aligns with the behavioral economic perspective, which suggests that time constraints and accessibility influence unplanned purchases (Chow, 2020). Furthermore, the perception of financial savings through bulk buying, particularly for non-perishable items such as toiletries, was a strong driver of on-the-spot purchases. While seemingly paradoxical, this behavior reflects the intersection of convenience and financial strategy: unplanned spending is often motivated not by impulse but by an effort to optimize time and resources.

Currency Conversion as a Psychological Anchor

The request for currency conversion highlighted the importance of financial orientation in the early months of cultural adjustment. Five out of seven participants emphasized how such a feature could help them better assess their spending, particularly before they develop a strong mental model of Canadian pricing structures. This aligns with previous research on acculturative

stress and financial adaptation, which suggests that international students experience initial difficulties in evaluating local costs, leading to increased financial uncertainty (Kristiana et al., 2022). This request ties into the concept of anchoring, where individuals rely on familiar reference points when making financial decisions (Tversky & Kahneman, 1974). By displaying prices in one's home currency, the app could help students make more informed spending decisions. Although one participant acknowledged that currency fluctuations may make direct price comparisons imperfect (which is a view I held as well), the consensus was that having this feature would serve as a psychological grounding mechanism, especially for students in their early months in Canada.

Design Decisions Informed by the Literature and Participant Feedback

In designing the prototype, I first drew on the structure of the CIFE model and the self-regulation strategies proposed by Moser (2020) to guide when and how different interventions within the tool might support users in managing unplanned purchases. User feedback – both explicit and observed, helped strengthen and develop the tool as a form of commitment device, "a self-imposed arrangement that compels oneself into compliance with a goal and is typically designed to eliminate future, goal-inconsistent choices." Features such as budgeting prompts and nudges were developed to support the stimulus, constraint recognition, and deliberation phases; motivational cues like streaks and progress indicators aligned with the volition phase; and tools like journaling and purchase history enabled reflection in the feedback phase. Taken together, these features, all informed by user feedback, translated Moser's (2020) self-regulation strategies into practical, context-specific design interventions for international students.

Reflecting on this process, Research through Design proved effective not only in helping me identify what features users needed, but also in clarifying how design itself could act as a mode of inquiry. The RtD process also pushed me to engage with ambiguity: situations where participant feedback was unexpected, or didn't align neatly with my initial assumptions. This challenged me to let go of fixed ideas and instead make design decisions grounded in the lived experiences of my participants. As a result, the tool evolved into something more situated, layered, and nuanced than I initially envisioned. In this way, RtD was not simply a method for evaluating a solution, but a means of *discovering* one through the act of designing. The process highlighted how design can operate as both a reflective and generative practice, especially when grounded in the real-world experiences of its intended users.

Conclusion

My study set out to explore unplanned and impulse grocery purchases among international students to develop a tool prototype that can help them manage their spontaneous grocery spending. The choice to design a mobile-based intervention was rooted in both practical and contextual considerations. For international students navigating unfamiliar retail environments, the mobile phone often functions as a constant companion—used to search for stores, compare prices, and manage finances. Its ubiquity and familiarity made it an appropriate platform to introduce moment-to-moment support without adding friction to the shopping experience. The digital format also enabled features such as dynamic budget tracking, journaling, and grocery discovery to be accessible when and where they were most relevant. The mobile based prototype drew on Impulse Buying Theory and Self-Regulation Theory and was informed by one focus group session and two user testing sessions.

This study shows that spontaneous purchase behaviors in international students are often rational, exploratory, and deeply contextual. Participants reported that curiosity—particularly in response to unfamiliar products or brands—was a key motivator in their initial months abroad. However, these curiosity-driven impulses were frequently moderated by price sensitivity and a growing attentiveness to budgeting and spending limits, reflecting an evolving self-regulatory capacity. This nuance complicates traditional views of impulse buying, positioning it not only as a response to psychological triggers but also as a site of learning and adaptive behavior.
The process of acculturation played an important role in shaping these behaviors. Students described how unplanned purchases often stemmed from the desire to engage with the new cultural environment or to seek comfort through familiar, home-country products. Over time,

however, these patterns evolved. What initially appeared as impulsive behavior increasingly took on the form of strategic, context-aware decision-making—where convenience, budget constraints, and even the physical act of shopping (e.g., carrying limits, time-saving choices) informed behavior. This gradual shift illustrates how self-regulation develops as students become more culturally and financially acclimatized.

The design of the prototype responded directly to these insights. Early versions of the tool had positioned unplanned purchases as something to be restricted or corrected. This was then reframed positively as an expression of one's curiosity to explore and engage with a new environment. Validated through iterative design and testing, the prototype evolved into a behavioral tool that embraced the positive dimensions of spontaneity while encouraging mindfulness. Rather than suppressing spontaneity, the tool sought to structure it.

By the final version (Prototype 7.0), the app had transformed into a more robust, user-centered platform, supporting not only budgeting and impulse awareness but also cultural orientation. Features such as currency conversion, grocery store guides, and the ability to explore ethnic and specialty stores spoke to the broader transitional experience of international students. These additions recognize that grocery shopping is not only a site of financial decision-making, but also one of identity, comfort, and cross-cultural integration.

Lastly, while the prototype was designed to embrace exploration and reflection, it still relies on the user's willingness to engage with the tool. The success of such an intervention depends on sustained interaction, and the study did not explore how motivation, habit formation, or app

fatigue might impact long-term usage. These behavioral dynamics present important considerations for future development.

Contributions to Theory and Practice

This research contributes to impulse buying and self-regulation theory. It does so by expanding on our understanding of impulse buying and self-regulation within the context of the international student experience. Practically, it offers actionable insights into how design interventions such as budgeting for spontaneous purchases, reflective journaling, nudges, and culturally relevant store guidance can be tailored to support international students in managing unplanned grocery spending. It highlights the value of presenting financial information clearly, leveraging small motivational cues like streaks and external goals, and incorporating features like currency conversion to reduce cognitive load during the early stages of adjustment. By emphasizing on curiosity and nostalgia as central to understanding unplanned consumption among international students, this research moves beyond the focus on internal traits primarily (e.g., impulsivity, materialism) and places greater emphasis on situated decision-making in cross-cultural contexts.

The prototype developed in this thesis introduces a behaviorally informed alternative to traditional budgeting apps, one that avoids punitive design in favor of encouraging mindful spontaneity. Features such as the "spontaneity budget," journaling prompts, currency conversion, shopping guides, and emotional reflection tools collectively form a design system that balances thoughtful decision-making with personal agency. These elements model a design approach that doesn't suppress behavior but instead structures it in ways that empower users to reflect, adapt, and make informed choices. While the tool was designed with international students in mind, it

may hold relevance for broader audiences as well. Several visitors to my exhibition expressed interest in using the prototype to manage their own unplanned purchases, suggesting the potential for its application among general and newcomer populations navigating grocery spending. Beyond its design contributions, this research also holds practical relevance for educational institutions. International students often face both financial strain and cultural disorientation during their early months abroad, and tools like the one developed in this thesis could serve as supportive interventions. Schools and universities could adapt or develop versions of this tool to provide financial orientation, reduce stress around spending, and help students build confidence in navigating local consumer environments. In doing so, institutions would not only support student well-being but also signal a deeper commitment to the holistic experiences of international students—strengthening their reputations as culturally responsive and student-centered spaces.

Limitations of this Study

While this study offers valuable insights into the intersection of unplanned grocery spending among international students, several limitations must be acknowledged. First, the scope of the study was limited to a small sample of international students based at a single institution (OCAD University) in Toronto. The experiences of students in different regions, institutions, or cultural settings may differ in meaningful ways, particularly in relation to cost of living, retail environments, and institutional support.

Second, the prototype was developed and tested within a relatively short design cycle and remains an early-stage intervention. While the iterative process incorporated user feedback and

meaningful refinements across versions, the tool has not yet been deployed in a real-world context over an extended period. As a result, the long-term effectiveness of the prototype in supporting behavior change or improving financial awareness remains untested. Additionally, participants in the study were self-selected and may have already had an interest in budgeting, reflection, or design-oriented thinking. This may have influenced the depth of engagement with the prototype and the kinds of feedback offered.

Future Possibilities

Future research would benefit from including a more diverse participant pool, including students with varying degrees of financial and design literacy, technological comfort, or familiarity with self-regulation strategies. Several additional features could enhance the prototype's ability to support a wider range of consumers navigating unfamiliar environments, beyond just international students. User testing with a broader audience and deploying early versions of the app in real-world settings could inform how the tool expands to help students not only manage unplanned grocery spending but also reflect on their broader consumption habits. There is potential to adapt the tool for newcomers more generally, including immigrants, refugees, and temporary visitors. While some features might also be beneficial to more vulnerable newcomer populations or even younger users who could use the tool to develop early awareness of their consumption patterns, such a direction would require an exhaustive, cautious and sensitive approach grounded in an understanding of their specific needs and experiences. Expanded language support and voice-based input could also make the tool more accessible to users with different linguistic backgrounds or those who may find typing and writing challenging. At the same time, any broadening of the user base would need to be carefully managed to avoid diluting

the focused support the tool currently provides to international students. Future iterations would need to thoughtfully balance adaptability with maintaining a sense of relevance and specificity for those navigating the challenges of cultural and financial transition.

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