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Exploring Microinteractions in Online Grocery Shopping: A Comparative Analysis Using Co-Discovery User Testing

João Morisso[1], Marcelo Gitirana Gomes Ferreira[1], Alexandru Cristian Rusu[2], Oriella Ortiz[2], and Kevin Vera[2]

[1]Design and Cognitive Interaction, State University of Santa Catarina, Florianópolis, SC, Brazil
[2]Engineering Informatics, Pontifical Catholic University of Valparaiso, 5th Region, Chile

ABSTRACT

This study investigates user interactions on two online grocery shopping (OGS) platforms, Santa Isabel and Jumbo, using the co-discovery method. Conducted in Valparaíso, Chile, the research explores microinteractions in usability and user experience (UX) through observational and comparative analysis. The study highlights how differing interface designs influence user interaction patterns, usability challenges, and satisfaction. In a controlled UX and Usability Laboratory setting, two experiments were conducted with participants aged 18–36, in groups of two and performed predefined tasks. The first experiment with four groups using the Santa Isabel platform, focusing on tasks like managing shopping carts, navigating without a search bar, and saving shopping lists. The second experiment had five groups interacting with the Jumbo platform, testing functionalities such as categories, search bar navigation, and adding items via recipe searches. Each session lasted 45 minutes, with screen and audio recordings for further analysis. Metrics like task completion rates, time spent, error frequency, and user satisfaction were collected. Results showed that Santa Isabel's platform presented challenges in navigation categories and increased cognitive load due to an inconsistent interface and lack of visibility for total costs. Jumbo's platform faced issues with non-intuitive search features, unclear navigation structures, and conflicting forms. Both platforms exhibited shared challenges, including inefficiencies in navigation and task completion. The co-discovery method provided nuanced insights into usability by capturing real-time collaboration and verbalized user experiences, revealing repeated microinteraction issues like adding items to the cart, navigating categories, and saving lists. Main findings highlight that Santa Isabel's platform struggled with categorization efficiency and total amount tracking, leading to a higher cognitive load. Jumbo's interface faced challenges with non-intuitive recipe search features. Results highlight the critical role of microinteractions in user satisfaction and task performance, especially those related to the search bar. These findings emphasize the importance of microinteractions in designing intuitive and efficient user experiences. The research demonstrates that collaborative testing methods are valuable for identifying interface inefficiencies and cognitive friction. It provides actionable recommendations for designing user-friendly e-commerce platforms, particularly in the growing online grocery sector, contributing to the broader fields of human-computer interaction (HCI) and UI/UX design.

Keywords: User experience, Microinteractions, Online grocery shopping, Usability, User interface

INTRODUCTION

Historically, grocery shopping has been conducted in person, where customers visit the physical supermarket, walk through the aisles, select the desired products, proceed to checkout, make the payment, and leave the premises. With motivations such as time savings, convenience, mobility challenges, and other factors, online supermarkets have emerged to perform these previously physical steps digitally. The online grocery market has seen exponential growth, with global sales projected to surpass $250 billion by 2025 (Statista, 2024). This shift highlights the increasing reliance on e-commerce platforms to meet consumer demands for convenience and efficiency. The practice of online grocery shopping gained significant popularity starting in 2020 because of the global COVID-19 pandemic. This shift, driven by the pandemic, has led to lasting changes in consumer preferences and behaviors. Post-COVID-19, consumer behavior has permanently shifted, with over 60% of global shoppers expressing a preference for online grocery shopping due to its perceived safety and time-saving advantages (McKinsey, 2023). As a result, a habit was established, with many continuing this practice even after the initial motivating factors ceased. According to Van Droogenbroeck & Van Hove (2019), users tend to continue utilizing online grocery platforms even after the initial adoption factors are no longer present.

Building on this context, two experiments were conducted to observe, analyze, and compare user interactions with the interfaces of two online supermarket retailers in Valparaíso, Chile, namely, Santa Isabel (Santaisabel.cl) and Jumbo (Jumbo.cl). Both chains, owned by the multinational consortium Cencosud, were founded in 1976—Jumbo in Santiago and Santa Isabel in Valparaíso. Since then, both have expanded to various cities across Chile. The research examines users' interactions within two online grocery shopping (OGS) platforms involving real, representative users and aims to explore microinteractions within this type of interface. Tasks were designed to cover common activities performed during grocery shopping and explore microinteractions within the user interfaces. The analysis of User Experience (UX) focused on human-computer interaction (HCI) with the interface, its usability, user perceptions, and satisfaction with the online grocery platform was conducted through the execution of a predefined tasks list. The research is built upon two different platforms, by which the authors show how differing user interface designs drive different uses of the interface, different microinteraction patterns, and different usability challenges. In this comparative approach, interface diversity drives more depth to studies concerning task performance and user satisfaction than isolated studies of OGS interfaces.

The study of user interfaces (UI) and microinteractions has become more evident in enhancing user experiences and usability in digital platforms, as every visual and interactive element affects user interaction within the OGS. A well-designed UI is crucial for a positive UX, ensuring usability, and ultimately driving customer satisfaction and possibly loyalty. In the context

of OGS, these elements play a crucial role in ensuring seamless navigation, efficient task execution, and overall user satisfaction.

Microinteractions are small, functional elements, contained moments of interaction within a user interface that serve specific functions, such as providing feedback, guiding users, or enhancing the overall experience (Saffer, 2013). In OGS, microinteractions, such as real-time feedback during cart updates or intuitive search suggestions, bridge usability gaps and enhance the overall shopping experience. These microinteractions can reveal significant insights into usability and UX, especially in navigation, cart management, and product presentation. The user interface interactions enhance user experience by influencing both usability and also emotional engagement. According to Ma & Chen (2021), microinteractions can significantly impact user emotions and perceptions. They are designed to evoke emotional responses, such as enjoyment and effectiveness, which are crucial for creating a strong connection between users and interfaces. This emotional engagement is achieved through elements like animation, feedback, and guidance that align with users' psychological expectations.

Microinteractions improve usability by making interfaces more intuitive and efficient, providing visual cues and feedback to reduce task completion time. For instance, using placeholders as triggers and providing instant visual feedback can enhance the usability of web-based forms (Falkowska et al., 2018). Usability, often defined as the "ability to be used," refers to the ease with which a product, service, or system can be utilized. This research draws on the conceptual foundation provided by Bevan, Carter, and Harker (2015), who revisited ISO 9241–11. It integrates attributes designed into a product through human-centered design (HCD) principles (Norman, 2004; Barrington, 2007; Rogers et al., 2013; Garrett, 2011; Lowdermilk, 2013) and is consistently evaluated through usability inspections or tests. Usability is a critical component of User Experience (UX), as outlined in ISO 9241–210 and Garrett (2011), encompassing the full spectrum of user interactions with a product, including their emotions, beliefs, preferences, perceptions, responses, behaviors, and accomplishments before, during, and after use.

Microinteractions do make interfaces more dynamic and functional. These small, purposeful interactions contribute to the fluidity and responsiveness of the interface, ensuring smooth transitions and enhancing the overall flow of user navigation. By incorporating elements such as progress indicators, error notifications, and visual cues, microinteractions keep users engaged, fostering an intuitive and enjoyable experience. The integration of these dynamic features is key for maintaining user interest, ensuring satisfaction, and ultimately building a connection between users and the digital platform (Ashbrook, 2010). The analysis of microinteractions during user testing helps to observe effectiveness as well as friction on how users interact with various components of an interface. By understanding user behavior in real-time, designers can identify areas where the interface may require adjustment to align with user needs and preferences. This user-informed approach ensures that design decisions are grounded in actual user experiences, improving usability and enhancing the overall satisfaction with the platform. Observing these interactions not only highlights potential barriers to user engagement

but also offers actionable insights for refining design elements to better serve the target audience (Gonzales et al., 2021).

METHODOLOGY: USER TESTING EXPERIMENTS WITH CO-DISCOVERY AND COMPARATIVE ANALYSIS APPROACH

Both experiments followed a user-centered approach, employing the co-discovery methodology (An & Soares, 2012). This methodology pairs two users to collaborate on completing tasks while verbalizing their thought processes. It was chosen to reduce the cognitive overload associated with traditional think-aloud protocols and facilitate natural conversation, providing richer insights into user interactions and more nuanced observational data.

The experiments were conducted in the User Testing Laboratory at the Pontifical Catholic University of Valparaíso (PUCV). The lab was equipped with screen and video recording tools, observation capabilities through a one-way mirror, and produced a controlled environment to minimize distractions and ensure data reliability. Data Collection Methods included observation notes to live interaction as well as analyzing recorded sessions and user interaction to identify when and how users engage with microinteractions. Signal their responses to feedback and whether they influence task completion. Screen recording can provide visual instances of microinteraction use, highlighting user reactions and behaviors in real-time. After the predefined task list completion, the participants answered surveys to collect qualitative data and gather insights on user perceptions of microinteractions, including their feelings about usability and satisfaction.

User Experiments Santa Isabel and Jumbo

Both studies share a core focus on evaluating and enhancing the usability and UX of online grocery shopping platforms. They employ a Co-Discovery methodology, that relies on emerging data from the verbal interactions of each group and the interaction with the user interface while they attempt to complete a predefined task list. After the user testing session, post-test questionnaires were used to gather more in-depth the user perception and satisfaction.

The studies target different supermarket websites and involve a slightly different number of participant groups. First, Santa Isabel with 4 groups of 2 subjects, then Jumbo with 5 groups of 2 in total the experiments were made with 18 subjects. Additionally, while both studies identify common usability issues, some specific challenges and recommendations vary based on the unique features and microinteraction elements of each website.

The task design varied between platforms to account for differences in interface functionality. For example, while Santa Isabel supported shopping list-saving features, Jumbo enabled recipe-based item searches, allowing the evaluation of unique microinteraction designs in each context. More common tasks, like navigation, search bar, and cart management, were contemplated in both task list protocols.

Table 1: Task Design main interactions (Authors, 2025).

Task List	Interactions in Santa Isabel	Interactions in Jumbo
Task #1	Search Bar Cart Management Unit selection Weight selection Checkout	Search bar Cart Management Unit selection Weight selection Checkout
Task #2	Navigation without search bar Saving shopping lists	Navigation without search bar
Task #3	Cart management with budget restriction	Cart management from recipe search

Experiments were made in sessions of 45 minutes each with a following protocol to acceptance terms. The evaluators explained the process to each group delivered the task list and highlighted the need to talk among themselves about the actions needed to complete tasks as well as reading out loud the instructions. The co-discovery approach was particularly effective in revealing collaborative dynamics and natural conversational insights. For example, when encountering a navigation issue, participants often verbalized their mental models, such as 'I expected the search bar to suggest results' or 'This category isn't where I'd expect to find this product.' These insights highlighted mismatches between user expectations and interface design.

Comparative Analysis Approach

To proceed with a comparative approach of the UI in Santa Isabel and Jumbo OGS platforms experiments, the study adopted criteria informed by key principles of usability and human-centered design. Drawing on Norman's (2004) emphasis on interface evaluation and considering how microinteractions (Ma, Chen, 2021) contribute to usability and user satisfaction. Additionally, the ISO 9241–210 (2019) guidelines on human-centered design informed the assessment of interaction effectiveness, ensuring that the platforms were analyzed with a user-first approach. The usability principles from Bevan et al. (2015), derived from ISO 9241–11, further structured the analysis by focusing on system efficiency, effectiveness, and user satisfaction as core evaluation metrics.

The comparative analysis centered on three main dimensions: task performance metrics, microinteraction effectiveness, and user satisfaction. Task performance metrics included the evaluation of task completion rates, as well as time taken on average to point if a group took too long to complete specific tasks, also the types and frequencies of errors encountered during the user testing sessions were useful to provide design recommendations. Microinteraction effectiveness was assessed by examining elements such as feedback mechanisms (especially in cart management), progress indicators of interaction (for task completion), and error notification handling. Finally, user satisfaction was gauged through post-experiment surveys and interviews, where participants provided qualitative feedback about their experiences with each platform. This comprehensive approach ensured that both

objective and subjective data were captured for a holistic evaluation of usability and UX.

To synthesize the findings for this paper, data retrieved from the user testing sessions were organized into comparative tables. These tables highlighted the strengths and weaknesses of each platform, enabling clear identification of areas for improvement and providing actionable insights for design enhancements. This methodological approach not only facilitated a detailed analysis of microinteractions and usability challenges but also contributed to the development of practical recommendations aimed at optimizing the user experience in online grocery shopping platforms for each case. The structured framework and diverse evaluation metrics ensured that findings were robust, reliable, and directly applicable to improving digital interfaces in e-commerce contexts.

The combination of experimental approaches is central to enhancing the exploration of microinteractions within OGS user interfaces. By employing co-discovery it was possible to gather verbalized thought processes, providing a comprehensive understanding of user behavior within UI interactions. The controlled laboratory environment and advanced data collection tools, including screen and video recordings, ensured the reliability and depth of insights obtained.

This approach allowed for a detailed analysis of how subtle interface elements can influence usability and emotional engagement. Moreover, the structured tasks and systematic observation methods facilitated the identification of strengths and weaknesses in both interfaces, grounding design recommendations in empirical evidence. The results highlight the comparative effectiveness of each platform's microinteractions despite the differences in UI and how they provide different interactions among users. Tables in the next section synthesize user performance metrics, microinteraction effectiveness, and additional insights to inform both immediate design improvements and broader implications for user interface design in online grocery shopping platforms.

RESULTS AND DISCUSSION

The data collection and analysis provide excellent opportunities to research the implications of UI interactions, UX, and microinteraction effectiveness. With combined datasets of screen recordings, audio transcription, and surveys it was possible to closely analyze, gather knowledge, and compile actionable design recommendations.

Despite differences in task design due to interface design-specific features, the comparative table provides an overall analysis of task completion in Table 2. Furthermore, in Table 3 there are comparisons in task performance as well as user satisfaction in self-reported post-experiment survey.

Table 2: Comparative task analysis highlighting success rates and errors (authors, 2025).

Task	Santa Isabel	Jumbo Findings
Task #1	All 4 groups completed successfully (some with errors in item quantity)	At least 2 of 5 groups completed successfully. 2 groups encountered errors with delivery web-form address insertion.
Task #2	All 4 groups completed, but two struggled to find products efficiently.	4 groups completed and one group did not. With difficulty in finding products within categories.
Task #3	All 4 groups completed successfully but had struggles with total amount visualization and cognitive load to budget tracking.	All 4 groups completed successfully, and one did not. 3 of them struggle to use the feature of search through recipe showing to be time consuming.

Task performance is greatly appreciated as metrics of usability that suggest the efficacy of the system interaction and user interface design. Even with minor errors, all groups could perform, to an extent, the tasks in the session according to the protocol. With the focus on exploring microinteractions within the UI, the transcript records of the section provided more nuanced information for small interactions like buttons, cart management, search functionality, forms insertion, and category navigation.

Table 3: Task performance metrics comparison (authors, 2025).

Task Aspect	Santa Isabel Findings	Jumbo Findings
Task Completion Rates	High completion rates, with minor errors	High completion rates, with minor errors
Time Taken Per Task	Tasks often prolonged due to unclear category organization and manual checks in cart management	Slightly faster tasks but delayed by filtering and recipe search issues
Error Frequency	6 errors among all groups and tasks	7 errors among all groups and tasks
Error Types	Common errors in managing quantities, dealing with unavailable items, saving lists, use category navigation	Errors in search functionality with filters and category navigation
User Comments	Users found the interface clean but frustrating for advanced tasks and total amount tracking	Users appreciated animations but noted inefficiencies in category descriptions

Continued

Table 3: Continued

Task Aspect	Santa Isabel Findings	Jumbo Findings
User Satisfaction	25% Very Satisfactory 62.5% Satisfactory 12.5% Fair n(8)	55.6% Fair 33.3% Satisfactory 11.1% Insatisfactory n(10)

The empirical exploration of microinteractions across the interface revealed complex patterns of user engagement based on task-oriented experiments. These small interactions encompass goals in cart management, search query processing, and category navigation, manifested in UI interaction by task-induced protocol. Overall observations can be grouped into feedback loops, progress indicators, and error notification systems. The comparative analysis demonstrated that these microinteractions served recurrent critical touchpoints during UI interaction, where the system's immediate responsiveness directly influenced both task completion efficiency and user satisfaction metrics. Notably, the implementation of visual feedback mechanisms during cart modifications, real-time search query validation, and category search demonstrated varying degrees of effectiveness in supporting user mental models. The observation of patterns provides insights into the relationship between microinteraction interface responses and user experience outcomes, suggesting that the orchestration of these minimal interactive elements plays a fundamental role in shaping overall task success rates and user perception of system reliability.

In regards to cart management, both studies highlighted user confusion with adding multi-pack items to the cart. Observing how users interact with quantity selectors, unit labels, and "Add to Cart" buttons did reveal that the users can't be certain of how many units were added to the cart sometimes. The navigation through categories and usage of filters also encountered difficulties in both experiments. Finding products due to unclear category labels and filtering options was demonstrated to be an issue. Analyzing how users browse categories, apply filters, and interpret search results can inform the effectiveness of microinteractions within the UI. The search bar feature included microinteractions triggered by search queries like auto-complete (if available) and suggestions of keywords. It was shown that the effectiveness of the search bar did reveal areas for enhancing search functionality. The search bar was the primary navigation tool for task completion. The task designed to be completed without the use of a search bar demonstrated a much more time-consuming interaction and produced confusion in both experiments.

The frustration of repeatedly checking the cart for the total cost in the Santa Isabel study did highlight the importance of keeping a persistent total amount visible and how this helps users view and manage their cart contents, as well as edit quantities, and track the running total. By exploring and meticulously analyzing these microinteractions, researchers could identify usability issues, pinpoint user frustrations, and provide targeted recommendations for improving the UI and overall user experience of online grocery shopping platforms.

Table 4: Microinteraction comparative analysis (authors, 2025).

Microinteraction Aspect	Santa Isabel Findings	Jumbo Findings
Feedback Mechanisms	Clear for basic actions (e.g., adding/removing items); frustration with unclear product unavailability feedback.	Intuitive animations for adding products; recipe search lacked adequate feedback for incomplete or failed searches
Progress Indicators	Lack of visible total price outside the cart; no clear visual flow for task completion	Budget tracker available but visibility limited; slightly better progress tracking
Error Notifications	Delayed and nonspecific (e.g., issues surfaced during confirmation rather than selection stages)	Issues with search errors (e.g., incomplete entries yielding better results than complete ones)

The analysis of search functionality revealed significant implications for user interaction patterns and task completion efficiency. The search interface incorporates some key microinteractions, including query auto-completion and keyword suggestion mechanisms, which serve as cognitive scaffolding for users' information-seeking behaviors. However, empirical observations from both experimental conditions demonstrated substantial opportunities for optimization of the search functionality as a primary navigation paradigm.

A comparative analysis of task completion methodologies yielded particularly noteworthy results when contrasting search-enabled versus search-disabled conditions. In scenarios where participants were constrained to navigate without search capabilities, the data indicated noticeably increased task completion times and elevated levels of user cognitive load, manifesting as observable confusion and disorientation within the interface hierarchy. This finding aligns with established principles of information architecture, which emphasize the critical role of search functionality in supporting efficient user navigation patterns, particularly in complex information spaces.

The consistency of these outcomes across both experimental iterations suggests a robust relationship between search availability and task completion efficiency, highlighting the search interface's critical role in supporting user mental models and navigation strategies in OGS. These findings carry significant implications for the optimization of e-commerce information architecture, particularly in contexts where rapid product discovery is crucial for user success.

CONCLUSION

The comparative analysis of the Santa Isabel and Jumbo UI interaction experiments highlights both strengths and weaknesses in their usability, user experience, and microinteraction design. The research revealed that both platforms excelled in providing clear visual presentations and responsive

designs. Santa Isabel's intuitive shopping cart and Jumbo's helpful search bar suggestions demonstrated the potential for effective microinteraction design in OGS.

However, the experiments also uncovered significant usability issues that hindered UX. Both platforms suffered from complex categorization systems, which created barriers to navigation. Small interface elements negatively affected usability, particularly for users managing product quantities. Ambiguous category descriptions also create challenges, while limited visibility of the total purchase amount creates cognitive strain, especially during budget tracking. In Jumbo, difficulties in locating recipes and inadequate filtering options were noted, alongside broken recipe search functionalities that disrupted the user journey.

Based on these findings, specific recommendations can be made to enhance the usability and microinteraction design of each OGS platform. A comprehensive redesign of category navigation should prioritize clarity and intuitiveness, while enhanced search functionalities and persistent total amount display can improve user navigation and reduce frustration. Optimizing the size of interface elements and providing clear product quantity indicators are crucial for fostering usability. Addressing broken search features in recipe sections and implementing actionable error notifications will further refine the user experience. Moreover, incorporating features to indicate out-of-stock items can prevent disruptions during shopping tasks.

In conclusion, this study calls on the importance of well-designed microinteractions in UI to drive satisfaction and usability in OGS. By focusing on user-centric experiments and addressing user-identified issues, platforms can better meet user needs, enhance engagement, and (possibly) establish loyalty. Future research should continue to examine how optimized microinteraction designs influence user experience across diverse demographics and platforms, suggesting that this area warrants more attention in HCI studies. With an emphasis on the role of microinteractions in shaping seamless and satisfying user experiences.

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REFERENCES

Ashbrook, D. (2010). *Enabling mobile microinteractions*. (Ph.D. Dissertation). Georgia Institute of Technology. Atlanta.

An, V. & Soares, M., (2012). A low-cost technique to evaluate usable products for small manufacturing companies: A case study on Garcia robot. *Work*, 41(4), 2089–2096.

Barrington, S., (2007). Usability in the lab: Techniques for creating usable products. *Journal of the Association for Laboratory Automation*, 12(1), 6–11.

Bevan, N., Carter, J. and Harker, S., (2015). ISO 9241–11 Revised: What have we learnt about usability since 1998? In: M. Kurosu, (Ed.), *Human-Computer Interaction: Design and Evaluation* (Vol. 9169, 143–159). Springer.

Falkowska, J., Kilijanska, B., Sobecki, J., & Zerka, K. (2018). Microinteractions of Forms in Web-Based Systems Usability and Eye Tracking Metrics Analysis. *Advances in Intelligent Systems and Computing*. https://doi.org/10.1007/978-3-319-94334-3_18

Garrett, J. J. (2011). *The Elements of User Experience: User-Centered Design for the Web* (2nd ed.). New Riders Press.

Gonzales, S., Carson, M., Viger, G., O'Keefe, L., Allen, N., Ferrie, J., & Holmes, K. (2021). User Testing with Microinteractions. *Information Technology and Libraries*, 40(1). https://doi.org/10.6017/ITAL.~V40I1.12341

International Organization for Standardization (ISO). (2018). *ISO 9241–11 Ergonomics of Human-System Interaction – Part 11: Usability: Definitions and Concepts*.

International Organization for Standardization (ISO). (2019) ISO 9241–210 *Ergonomics of Human-System Interaction – Part 210: Human-Centred Design for Interactive Systems*.

Lowdermilk, T. (2013). U*ser-Centered Design: A Developer's Guide to Building User-Friendly Applications*. O'Reilly Media.

Ma, J., & Chen, C. (2021). Evaluating user perception and emotion of microinteractions using a contradictory semantic scale. *Journal of the Society for Information Display,* 30(2), 103–114. https://doi.org/10.1002/jsid.1075

McKinsey & Company. (2023). *The next normal for grocery: Online shopping habits post-pandemic*. [Online]. Available at: https://www.mckinsey.com/industries/consumer-goods/grocery-online-shopping [Accessed 5 January 2025].

Norman, D. (2004). *Emotional design: Why we love (or hate) everyday things*. Basic Books.

Rogers, Y., Sharp, H. and Preece, J. (2013). *Design de Interação: Além da Interação Humano-Computador* (3rd ed.). Bookman.

Statista. (2024). *Projected global online grocery market size from 2021 to 2025*. [Online] Available at: https://www.statista.com/statistics/online-grocery-market-size [Accessed 5 January 2025].

Saffer, D. (2013). *Microinteractions: Designing with details*. O'Reilly Media.

Van Droogenbroeck, E., & Van Hove, L. (2019). Triggered or evaluated? A qualitative inquiry into the decision to start using e-grocery services. *International Review of Retail, Distribution and Consumer Research,* 30(2), 103–122.