Triggering curiosity in a user guide through information gaps using trivia questions

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Abstract

In the realm of product usage, user manuals are frequently overlooked, often due to their mundane presentation and the user's assumption about the product's simplicity. These overlooked manuals can hold vital information for product usage, safety, and enhanced user experience. In recent trends, user manuals have been digitised and made interactive, particularly for digital products, thus integrating the instructions within the product itself. This study proposes the application of the information gap theory, commonly implemented in advertising, to user manuals to trigger user curiosity. By stimulating the user's curiosity, I aim to encourage further exploration of the product, potentially leading to more personal uses and increased user satisfaction. I created a user guide for a versatile product, the CookingTotem, with trivia questions to create an information gap and generate curiosity. I tested this manual with 9 participants and conducted observations and interviews to gather data. While the trivia elements generally triggered curiosity as expected, I found that those who skimmed through the guide quickly often missed these elements, suggesting a need for further research on creating effective information gaps for such users.

1 Introduction

The user manual affects the user experience and is an integral part of post-purchase communication, where customers are reassured they bought the right product [12]. Despite this, people often skip the manual [2] and would instead find the answer to a problem themselves, from online sources, or through their mistakes [17]. By not reading the manual, people can miss important information such as how to maintain the product or potential legally required safety information [3].

In this research, I explore the potential of leveraging curiosity triggers in user guides to create a sense of curiosity and enhance the unboxing experience for non-electronic products. I hope this will motivate users to learn more about the product and explore personal use cases. The relationship between curiosity and creativity has been extensively studied. Previous research has suggested that positive emotions and curiosity are closely linked to the generation of original ideas [7, 8, 10, 14, 18]. Moreover, the information-gap theory of curiosity, proposed by George Loewenstein [15], provides valuable insights into how people become curious when they encounter a gap between what they know and what they don't know.

1.0.1 User Manuals.

Previous studies have explored different types of user manuals to be more engaging. Choi et al. [5] tested the implementation of a chatbot-based interactive product manual. They found it to offer advantages such as being more helpful, fun, engaging, educational, and better at explaining user inquiries [5]. Akahori et al. [1] studied the clarity of audible instructions. They found that different voices reading examples and explaining the results improve instruction clarity and enhance understanding. This approach may be applied to written or other interactive instructions as well [1]. Both examples have in common that they are interactive types of documentation, often structured by goals the user wants to achieve. This is a better way of structuring the information than explaining them in the order in which the features appear on the product [13].

1.0.2 Exploring the Product.

When exploring a new product to purchase, customers feel more inspired to buy it when they perceive the shopping channel as novel [9]. Similarly, customers are more likely to buy a particular product if they see more user-generated content (e.g. reviews) about it [19]. When exploring products one already owns, research suggests that creating new unintended uses of a product enhances customer engagement and the product's value [20]. Another study on the emergence of novel product uses by modifying existing products, also known as exaptations, found that users are more likely to achieve exaptations with modifying experience and when the product is more modular [4].

Based on this, we can argue that creatively exploring a product for new personal uses can positively affect the user experience and satisfaction. Additionally, encountering more user-generated content and the perceived novelty around the product may positively impact the inspiration to explore.

1.0.3 Curiosity and Creativity: Existing Links and Potential Causality.

A previous study identified a strong connection between positive emotions and creativity enhancement. Positive emotions, such as those arising from satisfying feedback, have increased individuals' ability to think originally [7]. This relationship underscores the potential impact of emotional states on creativity and original idea

generation. Literature on curiosity and creativity has explored the interconnectedness of these concepts, suggesting that curiosity may play a role in fostering creativity [10]. Studies have found correlations between curiosity and creativity in diverse settings, including elementary school-aged children and business employees, indicating a potentially bidirectional relationship between these constructs [8, 14]. Schutte and Malouff [18] argue that the relationship between curiosity and creativity depends on external processes. They found that the phenomena of flow, characterised by intense concentration and absorption, enhances the relationship between curiosity and creativity, while other processes may hinder it [18].

1.0.4 The Information-Gap Theory of Curiosity.

George Loewenstein's information-gap theory offers valuable insights into the mechanisms underlying curiosity. The theory entails that curiosity arises when individuals become aware of a gap between what they know and what they don't know. It identifies three factors influencing the intensity of curiosity: importance, salience, and surprise [15]. Building on the information-gap theory, Daume and Hüttl-Maack [6] have summarised existing literature on curiosity triggers, categorising them into information gaps, violation of expectations, and special curiosity-inducing procedures. Their review highlights various strategies, such as reduced information, stepwise information disclosure, and providing additional information, as effective means to create curiosity through an information gap. Furthermore, they studied the effects of curiosity triggers in advertising, with findings indicating that information gaps and violation of expectations significantly impact curiosity levels and positive emotions [6]. This underscores the potential of integrating curiosity triggers, such as trivia questions, into user guides to elicit curiosity and enhance user engagement.

This study's primary research question is: ***"How can information gaps in a user guide trigger a sense of curiosity when unboxing, and does this result in learning more about the non-electronic product?"*** The following sub-questions support this question:

- Are trivia questions an effective curiosity trigger in a user guide?
- How does a digital interactive user guide affect the initial user experience and satisfaction?
- Do curiosity triggers in a user guide increase the number of original uses explored?

By addressing these research questions, I aim to contribute to understanding how curiosity triggers in user guides can shape user experiences and knowledge acquisition in the context of non-electronic products. Ultimately, the findings of this research may inform the design of user guides that not only transfer information but also stimulate curiosity, thereby enhancing user engagement and facilitating meaningful interactions with the product.

This study was conducted with and for the company Design2Gather. Their goal is to create research methods that can quickly lead to valuable insights from existing customers so that they can make more informed decisions about designing new products for their customers.

2 Design of User Guide with Trivia Questions

I created a user guide with trivia questions for the CookingTotem to research the effects of trivia questions in a user guide on curiosity. The CookingTotem is a set of five pans, two handles, and two lids stacked into one compact and aesthetic totem, taking up much less space than regular pans with fixed handles. This is an example of a simple yet versatile product that can offer a better experience when the user explores and learns more about it. Past research shows us that trivia questions effectively trigger curiosity and positively influence the ability to memorise information by opening an information gap [11, 16]. I specifically chose to use this trigger instead of other triggers because trivia questions are inherently interactive, something that can potentially drive engagement with a user guide.

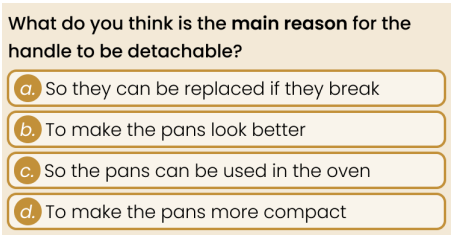

Figure 1. Trivia question about the reason behind the detachable handle (*d* is correct)

The first trivia question asks why the handles are detachable (see Figure 1). All four options are valid, but the participant must guess which option was the original reason for making them detachable. I chose this question because the user could not know the answer for sure, but the answer could make sense and be easy to guess. Guessing correctly can feel rewarding, evoke positive emotions, and inspire the user to continue [7].

The second trivia element is a quiz containing eight questions about cleaning the pans:

1. Squeaky Clean: What is the best tool to use when cleaning a pan to avoid scratching the surface?
   A) Steel Wool
   B) Nylon Brush*
   C) Metal Spatula
   D) Plastic Fork
2. Bubbling Trouble: You notice some stubborn food residue on your pan. What should you avoid to keep the coating intact?

A) Letting it soak in warm, soapy water
B) Using a soft sponge
C) Scrubbing with a stainless steel pad*
D) Gently wiping with a paper towel

3. Magic Mixes: Which household ingredient can help clean a pan without damaging it?
   A) Baking Soda*
   B) Coarse Salt
   C) White Vinegar
   D) Olive Oil
4. Heat Wave: After cooking, what's the best way to cool down your pan before cleaning it?
   A) Plunging it into cold water immediately
   B) Letting it sit at room temperature for a while*
   C) Putting it in the freezer
   D) Running it under hot water
5. Dishwasher Dilemma: True or False: It's perfectly safe to put the pans in the dishwasher.
   A) True*
   B) False
6. Soapy Science: What is the best practice for washing the pans?
   A) Using warm water and mild dish soap*
   B) In the dishwasher
   C) Using hot water and harsh detergent
   D) Skipping soap altogether

Unlike the first trivia question, only one answer is correct in the quiz questions. The quiz provides relevant insights into how the product should be cleaned and maintained.

The third trivia question asks how to damage the pans rather than the more logical question of how not to damage them. This phrasing is intentional, as it could surprise the user and increase their curiosity [15]. It provides eight options that could damage the pans. The user can select multiple answers and view the correct answers by pressing a button (see Figure 2). Of course, with this being important information for a user guide, users can find the regular information on the next page if they do not want to answer the trivia question.

Because user-generated content enhances inspiration and creativity [19], I included four texts that look like they were written by other users. Three of these are relatively standard and showcase legitimate features of the product, while one is more "weird" and meant to surprise the user to increase their curiosity [6, 15]. The posts can be seen in Figure 3. Underneath these posts, I added a button for users to write their own.

Finally, the guide prompts the user to explore the product and stack it in a configuration with the pan on top that they expect to use most often. It instructs the user to ensure no metal touches any flat metal surfaces (to avoid scratches) and prompts them to find a place to store the handles. I added an interactive tool where users can enter how they stacked the pans and digitally try any possible combinations. The final page includes a sign-up link for the newsletter and instructions for contacting the company if something is wrong or they need help.

*Correct answers

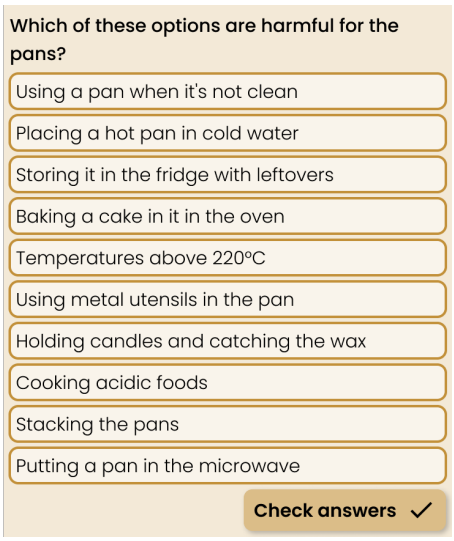

Figure 2. A trivia question which offers multiple choices on what could damage the pans, asking the user to select all relevant options. *1, 2, 5, 6* and *10* are correct.

Figure 3. Four posts mimicking user-generated content to showcase product features and be surprising

I created a physical and a digital version of the user guide with the same contents. The physical version, printed as an A5 booklet, visually shows the trivia questions and features a QR code linking to the digital version. Links to both versions can be found in Appendix A.

3 Method

I conducted a user test with 9 participants to evaluate the user guide made for the CookingTotem. Before this, I performed a pilot test with 2 participants, which I used to adjust the user guide and refine the method.

3.1 Participants

I recruited 9 participants with varying ages for the user test, 5 of which were students. Additionally, 2 participants took part in the pilot test to provide feedback on the refined guide.

3.2 Materials

I created a user guide for the CookingTotem product, incorporating trivia elements and offering both physical and digital versions as described in Section 2. The physical guide featured a QR code that linked to the digital version. I also prepared consent forms for the participants (see Appendix B) and used MS Forms to take notes during the observation and interview.

3.3 Procedure

During the user test, which took between 15 and 30 minutes, I asked participants to unbox the product and read the user guide as if they had just received it. Before this, participants were asked to sign a consent form. The goal was to observe how individuals engaged with the guide during unboxing. I took detailed notes on whether participants read the guide in detail or skimmed through it, if and when they scanned the QR code, which trivia questions were answered, and any other notable observations. Following the unboxing process, I conducted semi-structured interviews with each participant to gather insights on their interactions and experiences with the guide.

The interview questions included:

- Why did/didn't you read the guide in detail?
- Why did/didn't you scan the QR code?
- Why did/didn't you do the trivia questions in the interactive guide?
- Why did/didn't you sign up for the newsletter?
- How did you feel when asked to find your own configuration of the pans?
- How curious did the guide make you feel? *(1-10)*
- What made you feel curious?
- How would you rate the guide? *(1-10)*
- Would you be more willing to participate in future customer research conducted by the company based on this guide?

In cases where participants only quickly skimmed through the guide, I asked them to take a closer look and noted their reactions for further analysis.

3.4 Pilot Test

Before the user test, I conducted a pilot test with 2 participants to gather feedback on the first version of the user guide. Based on the feedback, I made further adjustments to improve the guide and the research methodology. Most notably, I added more contrast to the trivia questions to make them stand out more when people are skimming the guide. I initially created a second version of the user guide without curiosity triggers, intending to perform a quantitative comparison. However, because of the difficulty of finding participants and the limited time available, I decided only to test the version with triggers and focus on the qualitative insights from the interview.

3.5 Data Analysis

To answer the research question, I collected and analysed data on whether participants opened the digital guide by scanning the QR code and why. In the interview, I asked them to rate how curious the guide made them feel from 1 to 10, what made them curious, and their experience. In the analysis, I compared participants who opened the digital guide to those who did not to find potential differences in reported curiosity levels, their curiosity triggers, their experience with the guide, and how they explored the product. I analysed the data by opening it in Excel, filtering on specific observations (such as whether they opened the guide) and comparing other observations and their answers to the questions.

4 Results

The qualitative data analysis from the user test provided insights into the participants' interaction with the user guide with curiosity triggers. In this analysis, I consider opening the digital guide a sign of curiosity. Of the 9 participants, 5 opened the digital guide, while 4 did not.

Among the participants who opened the digital guide, all of them mentioned they did so to answer the trivia questions. 3 participants (including 2 students) specifically cited curiosity as their motivation. They reported higher ratings for how curious the guide made them feel (M = 7.33, SD = 0.577). They also expressed curiosity about the trivia questions and the exploration prompt, indicating that the guide's content effectively piqued their interest. On the other hand, 2 participants (including 1 student) mentioned fun as their reason for answering the trivia questions. They reported lower curiosity ratings (M = 2.5 and SD = 0.707), and one participant expressed a feeling of competitiveness rather than curiosity.

The average rating for the digital guide, as provided by the participants who opened it, was 8 out of 10 (SD = 0.707).

Additionally, 2 participants attempted to create their own configuration based on the guide but stayed close to the original configuration. 2 participants reported they did not see this step in the guide, and 1 participant prefers to keep the original configuration because the product is intended that way.

Among the participants who did not open the digital guide, 2 participants aged between 50 and 60 indicated that they would scan it later after getting to know the product. Further, they mentioned the questions did not make them curious because they expected to know the answers already. Their curiosity was still triggered by the creative inspiration and the configuration exploration, both rating their curiosity with 7 out of 10. 2 other participants, both students, mentioned not noticing the QR code because of skimming the guide but that they would have scanned it if they knew it was there and where it leads. They rated their curiosity with a 6.

The participants who did not open the digital guide provided an average rating of 6.5 out of 10 (SD = 1.732). One participant expressed dissatisfaction with the presence of trivia questions and preferred a guide without them, so they rated the guide lower than the other participants. Additionally, 1 participant tried to explore their own configuration but failed to do so after many attempts and finally rebuilt the original configuration. 2 participants simply stacked the pans inside each other from large to small, not having read the instructions thoroughly. 1 participant did not explore any configuration but reported that they would have if the guide provided some examples of different configurations.

One thing that stood out was that all participants who opened the digital guide answered every trivia question they encountered in the digital guide. Further, they rated their experience with the user guide higher than those who did not open the digital version, with a mean rating of 8.0 (SD = 0.707) compared to 6.5 (SD = 1.732). Another notable finding is that not everyone initially noticed the trivia questions or the QR code in the guide due to skimming behaviour.

5 Discussion

In this section, I review the results and attempt to formulate answers to the research question, starting with the subquestions. After this, I will review some future work opportunities and highlight some of this research's limitations.

Are trivia questions an effective curiosity trigger in a user guide?

The user test results provide relevant insights into implementing information gaps in user guides, specifically through trivia questions. The results show that the trivia questions implemented in the user guide effectively highlighted an information gap and triggered a sense of curiosity. This is evident from the 4 participants who explicitly mentioned they wanted to know the answers to the question, indicating curiosity, and pointed out the questions when asked what made them curious. This aligns with prior research findings that trivia questions can trigger curiosity [11, 16], which also holds up in the context of user guides. Furthermore, 1 participant mentioned the information behind the trivia question they read was unimportant to them, and 2 older participants stated that the questions did not make them curious because they felt confident that they knew the answers already. Both of these findings correspond with the information gap theory, respectively: low importance (personal relevance) of the information results in less curiosity, and already knowing the information results in a smaller information gap and, therefore, also less curiosity [15]. Based on this, trivia questions are an effective tool to highlight information gaps and trigger curiosity in a user guide; however, this depends on the user's preferences and current state of knowledge. Ideally, questions are not too easy but not too challenging to ensure people do not yet know all the answers and feel positive emotions whenever they get a correct question.

How does a digital interactive user guide affect the initial user experience and satisfaction?

The participants who opened the digital guide interacted with every trivia question and rated their experience better than the participants who did not open the digital guide. Some participants mentioned that the trivia questions were fun, and participants generally displayed positive emotions when they got a question right. This aligns with the theory that closing an information gap can be perceived as satisfying [15]. Based on these results, I can argue that a digital interactive user guide can positively affect the user experience and satisfaction. Still, more research is needed to formulate a definitive answer.

Do curiosity triggers in a user guide increase the number of original uses explored?

Of the participants who opened the digital guide, 2 participants created a slightly different configuration than the original one, 1 preferred not to, and 2 did not see this step. Of the participants who did not open the digital guide, 1 participant attempted to make a different configuration but could not find one, and 2 participants stacked them differently, but in a way that would be damaging to the pans and not according to all instructions. Moreover, not all participants who tried to create a new configuration reported high levels of curiosity; some only mentioned they were curious because of the ability to configure the set differently and not because of the trivia questions. Based on these findings, I cannot provide a conclusive answer to this question. While it is true that the only two successful attempts came from people who opened the digital guide, it proved to be a difficult task to explore this product, meaning the answer might be different for every product depending on how "explorable" it is. This aligns with the findings by Chan and Lim that the ability to find original uses for a specific product depends on the skill (and creativity) of the user and the modularity of the

product [4]. To this, I would like to add that it also depends on the "explorability" of the product, a potentially interesting product attribute that may require further research to define appropriately.

How can information gaps in a user guide trigger a sense of curiosity when unboxing, and does this result in learning more about the non-electronic product?
Trivia questions effectively trigger curiosity when used in a user guide, but only when the user notices them. If a user skims through the user guide too quickly, they may miss the trivia questions completely, meaning no curiosity will be triggered. A possible explanation is that people don't expect interactive elements in a document printed on paper; therefore, any interactive elements that do not stand out enough will not be noticed. When the trivia questions are noticed and answered, based on my findings and existing literature, I believe they can enhance learning about the product [11, 16].

5.1 Future Work

Based on this study, I can recommend the following opportunities for future research:

- Research how to ask trivia questions that have a properly balanced difficulty. For there to be an information gap, people should not immediately know all the answers. Still, people should get at least some questions correct to stay motivated to continue answering trivia questions. Perhaps one way to achieve this is by personalising the trivia questions based on the user.
- Research how much impact a digital interactive user guide has on the user experience and satisfaction of using a guide. Perhaps a study can be created that compares a physical guide to a digital one.
- Research how to motivate people to open a digital manual as soon as possible. Since it is digital, people may expect interactive elements when skimming through it, making the trivia stand out more and allowing people to learn information interactively.
- Exploring whether products have an attribute like "explorability", how this can be defined and what this means for user guides prompting the user to explore the product more.
- In the user test, I did not find any relationship between the experience with the user guide and the willingness to participate in future customer research. However, most people reacted positively when asked if they would answer simple questions embedded in the user guide. It could be researched how to embed questions in a (digital) user guide so users will answer them. Another interesting research direction would be collecting data in the background, such as clicks, and if this can provide insights into the user's opinions about and experiences with the product.
- The current developments in generative AI offer an opportunity to create engaging user guides using generative AI models. For the user guide I tested, I used ChatGPT to generate the quiz about cleaning and adapted it to be suitable for the product. I believe generative AI has the potential to create engaging and creative user guides or at least parts of one. More research could be done on how it can be used and potentially automated for multiple products.

5.2 Limitations

Initially, I made two versions of the user guide. One version had the trivia questions, and one version did not and had all the information immediately given. I initially intended to test both versions with a random half of the participants to compare them against each other but decided not to because of the low participant count. Instead, I focused more on the qualitative insights from observations and interview questions about the guide with trivia questions.

5.3 Role of the Client

This study was conducted with and for the company Design2Gather, designers of, amongst other things, the CookingTotem. Their goal is to create research methods that can quickly lead to valuable insights from existing customers so that they can make more informed decisions about designing new products for their customers. For them, it was relevant to know how the user guide could collect customer data and prime and funnel customers into more extensive research methods such as a narrative survey or automated diary studies via WhatsApp. These were difficult things for me to test in this time frame and with participants who are not actual customers, but I believe my results are still valuable, and I hope they can be helpful for Design2Gather.

6 Conclusion

In conclusion, the study revealed that including trivia questions in a digital user guide can positively impact user engagement and satisfaction. Participants who engaged with the digital guide displayed more positive emotions and rated their experience higher. However, it also highlighted the difficulty of making the curiosity triggers stand out enough for people skimming the guide and making them curious.

The findings also suggest the need for further research in several areas, including personalised trivia questions, the impact of digital user guides on user experience, motivating users to engage with digital manuals, defining and exploring the concept of "explorability" in products, and utilising generative AI for creating engaging user guides.

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First, thank you to Bas for arranging a CookingTotem for me to use during the user tests.

When designing the user guide, I used ChatGPT to generate a quiz about cleaning the pans and some answers to the damage trivia. I filtered and adapted these outputs to be correct and related to the product. Further, during the writing process, I used generative AI (Grammarly AI) to recommend a structure for the methods and results section based on bullet points of information written by me. I also tried this for the introduction, but the output was useless so I did it myself. I rewrote the majority of the text it produced, except maybe some small structural sentences, and made adjustments to the structure. I used Grammarly to check for spelling errors and enhance readability.

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A Links to Physical and Digital Guide

- The digital guide can be accessed via the following link: https://manual.jjochem.nl
- The physical guide can be accessed via the following link: https://manual.jjochem.nl/print.pdf

B ERB form, Consent Form, and Confirmation Email

On the following pages, you will find the signed minimal-risk ERB form, the consent form used in the user test, and a PDF of the confirmation email from the Ethical Review Board.