

No Choice, No Trust?

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ABSTRACT

We present a feedback design solution for a user interface about a dynamic web service recomposition, which exhibited trust issues in an accompanying questionnaire study. By examining the design in detail and identifying the factors (as well as their interrelations) that caused the distrust, we discuss what could be done to avoid distrust through design in the future.

Categories and Subject Descriptors

H.5.2 [Information Interfaces and Presentation]: User Interfaces – *Evaluation/methodology, Screen design, User-centered design.*

General Terms

Design, Security, Human Factors.

Keywords

Trust, Web Service Recomposition, Feedback Design.

1. IMAGINE...

An online shop offers its customers the possibility to customize payment options and the necessary information to complete a financial transaction to their customer profile. The user must then choose a default payment option and rank remaining options according to preference. When making a purchase, the system will automatically attempt to conclude the transaction via the default payment method. If this fails, the system will automatically proceed through the payment option list until successful or every available payment method has been exhausted.

Example: A customer with three registered bank accounts on the website places an order. Payment via the first account fails due to lack of funds. The payment system automatically attempted to fulfil the order using the second account and succeeded. As the transaction is complete, there is no need to use the third registered account.

Now imagine, you are a registered customer and own two credit cards, each of which belonging to a different bank account. The two bank accounts belong both to you and you already added the corresponding credit card details to your payment options via the website's user settings page. You have decided to purchase product X via the website and are right now – after having successfully logged in and chosen the product – clicking the “Purchase” button to finalise your purchase. A window pops up

and displays both payment options in separate frames with a progress bar in each of them (see Figure 1a). The upper frame, which displays the number of your primary credit card, is highlighted and you can see its progress bar filling from the left. The lower frame contains the number of your other credit and is currently greyed out. After a few seconds the progress bar stops moving and the whole upper frame is greyed out (see Figure 1b). A red triangle containing an exclamation mark appears in the upper right corner as the lower frame becomes active and its progress bar starts to fill. Several seconds later the progress bar is completely filled and a green circle with a checkmark in it appears in the frame's upper right corner (see Figure 1c). After that, both frames disappear and the window displays “Payment was successful!” with another checkmark in a green circle and the number of your second credit card beneath it (see Figure 1d). Further below you see the red triangle with an exclamation mark in it again and beneath that a red box stating “Payment via [credit card 1] was NOT SUCCESSFUL! Please visit [link to credit card provider's website] for further info”.

Given the provided situation, would you like to be informed about the automatic payment transposition in the given way? Would you trust such a website? Before taking a look at our participants' answers to these questions we will provide some more background information about the presented feedback design and the evaluation process.

2. BACKGROUND

The scenario and design prototype presented here have been part of a project study with the aim to find an appropriate feedback solution for informing website users about a so-called web service recomposition. Assuming that the future internet will provide web services (e.g., payment services, booking services, weather services) offered by diverse suppliers and composed in different ways, there is a need for ensuring secure and trustworthy behavior of such a changing service environment. The project Aniketos (www.aniketos.eu) aims at monitoring whether the web services of a specific website are secure and trustworthy. In case a particular web service is threatened, another secure service will replace it, i.e. a web service recomposition takes place. From a technical point of view, the challenge is to provide adequate tools and methods for service developers and providers in order to ensure the trustworthiness and security of the web services and to provide mechanisms for automated service recomposition. However, there could still be risk involved for the website user even with automated service recomposition. The question then arises if and how a website user should be informed about such a web service recomposition, while continuing to ensure trust in the website.

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This question actuated our research. We began with a broad literature review on trust, risk, website security information, and website user types. This was followed by an interview study with eight participants in order to find out which requirements arise for this specific issue. Based on our findings, the feedback solution presented had been developed in a workshop with six HCI experts. The design was developed for a persona with pragmatic character traits when it comes to security and privacy, especially for the scenario described in Section 1 (i.e., a website offering automatic payment transposition). A *pragmatic Internet user* type is characterized by having specific privacy concerns and particular tactics for addressing them (e.g., a pragmatist's privacy concerns might be reduced due to privacy protection measures on websites). More than 50% of Internet users belong to this group [1].

3. METHOD

In order to evaluate the feedback solution in terms of user acceptance of and trust in the website, we developed an online questionnaire. The participants were given the textual description of the scenario (as presented at in Section 1), followed by questions regarding the general use of the described website, general need for information about the occurring service recomposition, and items regarding acceptance of and overall trust in the website. Acceptance and trust items were based on existing questionnaires [7, 8, 12] and adapted for our purposes. We distributed two different versions of the scenario description. The first version only provided participants with the scenario description and information about the payment procedure, no additional feedback about the service recomposition (i.e., only the information “payment was successful” was provided). The second version provided the feedback solution before providing the questions. With the second version, participants were additionally asked whether they would like to be informed about the service recomposition in the proposed manner. We chose this approach in order to be able to compare acceptance and trust in the website when (1) no feedback about the service recomposition is given and (2) feedback about the service composition is provided. Our assumption was that providing feedback to the website user should raise the acceptance of and trust in the website, compared to the no-feedback condition.

4. RESULTS

In total, we received 101 completed questionnaires. The mean age of the participants was 26 years ($s=8.59$); the youngest person was 18 and the oldest 65 years old. Female participants comprised 75%, while 25% were male. Generally, 14% of participants confirmed that they would use a website with automated payment transposition, whereas 37% indicated that they would rather not use such a website and 48% stated that they would not use it by any means. In general, 78% of participants replied that they want to be informed in all cases about the payment transposition, 17% would prefer to be informed, and only 5% did not wish to be informed. This indicates that there is indeed a need for adequate feedback among a significant majority of all participants.

Half of the participants were presented the feedback solution as described above and shown in Figure 1 (the others did not receive this feedback). These participants were further asked whether they would want to be informed about the payment transposition in the presented way.

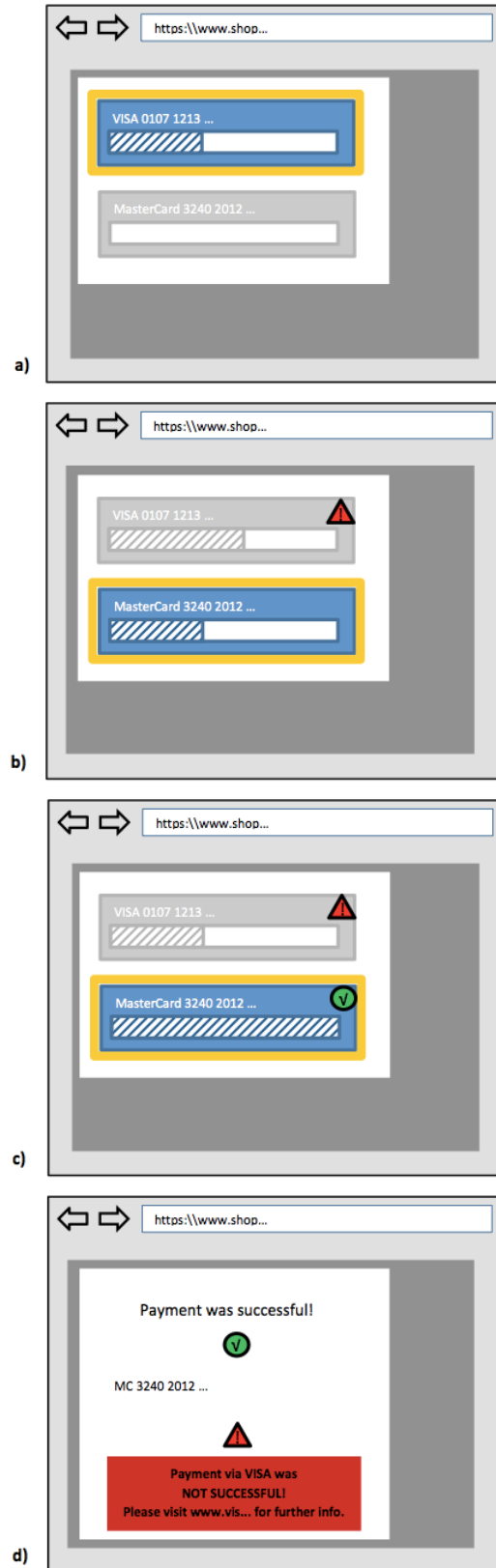


Figure 1. Feedback design prototype.

More than a half of the participants (60%) replied that they want to be informed in this way while 40% would prefer another way.

Comparing the feedback and the no-feedback condition, we could not find any significant differences regarding the acceptance of the website, independent of whether the participants were happy with the feedback solution ($t=1.569$, n.s.) or not ($t=-.420$, n.s.). For trust, we found different results. Participants who were satisfied with the feedback solution did indeed show significantly higher trust in the website when feedback was provided ($t=2.546$, $p<.05$), confirming our initial assumption. However, 40% were dissatisfied. We also found no difference regarding trust in the website compared to the no-feedback condition ($t=-.146$, n.s.). From that point of view, our feedback solution cannot be considered as satisfactory. Hence, the question arises: What is the problem with the feedback solution?

4.1 The problem of no choice

Participants had the possibility to comment on which kind of solution they would prefer if they were dissatisfied with the presented feedback. Approximately 40% of the participants desired the possibility to select themselves whether or not another account shall be used; or the possibility to cancel the payment if the first account is not successful. For example, one participant stated, "I would like to chose, whether I use the second saved card or whether I provide a third account for the payment. I perceive the automatic change as disruptive and would like to interfere at this point." Another stated, "It lacks the possibility to cancel the automatic payment with the second card." Having no possibility to intervene or to control the situation appears to be a large issue. Our feedback solution is indeed passive, i.e. the user has no possibility to carry out any further actions. However, we originally did not consider this as a problem, as the service recomposition process takes the preset preferences of the user into account. Our results show a definite tendency towards no choice, no trust. This means that as long as there is some risk involved for end users, they want to have the possibility to intervene, even if it means slightly less automatisation due to more required user input.

4.2 The problem of color-coding

Participants also had issues with the red warning box presented when an attempted transaction was unsuccessful (see Figure 1d). Of these participants, 20% had problems, deeming the size and color scheme a bit too frightening. One participant stated, "I would think that the payment has not worked because of the big red box in the end". Another participant stated, "The illustration in picture 4 would scare me. A light blue info box would be preferable. When seeing red, I think one immediately thinks about money loss or other serious errors." The red warning box is a misleading feature of our feedback solution that reinforces concerns about security. This may also go hand in hand with the "no-choice" situation the user is in. Red, as warning color, might be more helpful in situations where the user can chose among alternatives. The color red could point to the alternative with the worst consequences for the user. In our case, we had a no-choice situation and so our red icon had only a frighten-off effect without discernible benefits.

Other comments of participants addressed the preference of the illustration shown in Figure 1d (13%) or to be given a written hint that payment with account 1 was not possible and therefore account 2 was chosen. Other comments addressed another

configuration of the pop-up window, more information about the occurred error, and the wish to be informed per email.

5. DISCUSSION

The evaluation of our feedback design solution showed that an improper use of color-coding and offering the user no choice had a negative impact on the overall trust in the described website. However, this was only the case among those participants who were dissatisfied with the presented feedback design solution. Participants satisfied with the way feedback was provided, on the other hand, also showed higher trust in the website.

We believe this strongly supports that the trust decision in our case was primarily made at an emotional level, i.e., how participants felt about the feedback design. Participants were presented with direct information about a novel scenario. While there are parallels to existing situations, the overall novelty of the scenario meant that participants were unable to consider cognitive aspects such as knowledge or experiences, but rather affective aspects as mentioned above. Statements like, "I perceive it as disruptive" or "It would scare me" also point to a more emotional direction. In literature regarding trust and the development of trust in automation (e.g., [5, 9, 10]), affective aspects play an important role especially when interacting with a system for the first time.

From that perspective, we are aware that giving the user no choice, no control has high likelihood to disturb trust in new systems. This is not necessarily true when the user is already familiar with the system. As previously mentioned in Section 4, the issue of color-coding may go hand in hand with the no-choice situation. Furthermore, we believe that this issue points to another potential aspect of distrust: scarce aesthetics.

In our investigation, we did not explicitly investigate the perceived aesthetics of the feedback solution and comments on that were sparse. However, one participant stated, "The combination of the green OK sign and the red warning box is bad, because it is optically conflicting." Several findings from literature (e.g. [2, 3, 4, 6, 13]) support a relationship between trust and aesthetics, assuming that better aesthetics lead to higher trust. Hence, an "ugly interface" is likely to lead to distrust and, therefore, aesthetics is an important factor that should be taken into consideration.

From a more high-level perspective another issue in our investigation was certainly the system transparency. In providing information about the ongoing service recomposition, we followed Nielsen's usability heuristic for user interfaces "visibility of system status". It claims that a system should always keep users informed about what is happening, through appropriate feedback within a reasonable time [11]. Despite that some participants found the feedback inappropriate, another important question arises with the automated process. To which extent does not providing information about ongoing system activities lead to distrust? Literature indicates that there is a strong relationship between transparency and trust (e.g., [10]).

In conclusion, we think that no choice, wrong color, ugliness, and no transparency can be considered as items to create distrust. We believe that our evaluation findings will enrich the discussion about evoking distrust through user interface design and we are looking forward for fruitful exchange with other workshop participants.

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