

Visual Nudges for Enhancing the Use and Produce of Reputation Information

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ABSTRACT

In this paper, we aim to analyse the current level of usability on ten popular online websites utilising some kind of reputation system. The conducted heuristic and expert evaluations reveal a number of deficiencies on the overall usability of these websites, but especially on how the reputation information is currently presented. The low level of usability has direct consequences on how accessible and understandable the reputation information is to the user. We also conducted user studies, consisting of test tasks and interviews, on two websites utilising reputation information. The results suggest why the currently provided information remains under-utilised and, to a great extent, goes undetected or gets misinterpreted. On basis of the work so far, we propose ways to overcome some of the current problems by changing, rearranging and grouping of the visual elements and visual layout of the reputation information offered on the sites. The enhanced visualisations create “visual nudges” by enhancing the key elements in order to make users notice and use the information available for better and more informed decisions..

Categories and Subject Descriptors

H.5.2 [Information Interfaces and Presentation]: User Interfaces:
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General Terms

Design, Security, Human Factors

Keywords

Usability, heuristics, expert evaluation, user study, recommendation, reputation, visual nudge, user interface design

1. INTRODUCTION

As Internet services and peer-to-peer systems currently are lacking in the traditional indicators of trustworthiness [3], being able to differentiate between a good offer and a bad one in an easy manner is not trivial. In the peer-to-peer markets especially, information about the reputation of the various parties in the online transactions – the buyer, seller, and venue – can help to make good decisions and diminish the risks involved [5].

Reputation systems have grown into a prominent means to gather and provide such information about the quality of the offering and its seller for the end user. A reputation system

operates by computing reputation scores for some set of objects, such as services or items on sale, within a certain community or domain. The scores can typically be computed on basis of a collection of opinions – usually ratings – that other entities hold about the objects, by employing a reputation algorithm to calculate reputation scores based on the received ratings, which are then published. Reputation information typically represents users’ opinions about a particular product, service or peers [5].

Reputation information can be textual (e.g. descriptions, reviews) or visual (e.g. images, symbols, statistical visualisations), or, usually, a combination of the two. However, currently the reputation information is often presented in such a way that may make it hard to notice and to interpret. To make things worse, according to our heuristic and expert evaluations, the overall level of usability on the sites offering reputation information is often bad enough to stop users from effectively having the reputation information at their disposal, as it goes undetected: if the user cannot find the functionality, the functionality is not really there [12]. The reputation information is not utilised as guidance in the way it could and should be.

Which parts of the reputation information is presented visually needs to be carefully selected: Our user studies [9][16] evaluating websites that use reputation systems have shown that the visually prominent parts of the reputation information offered gets center stage, regardless of its actual usefulness and relevance for the decision making. Furthermore, cohesion between the various reputation elements is often missing and the reputation information is experienced as scattered, with unrelated pieces of information that are being used in random combinations that is dictated by their visual prominence, rather than by their actual importance for the decision-making.

To further investigate the described issues we have evaluated ten more websites of different categories (news, shopping, social networking etc.) that employ some kind of reputation system. The main objective of the usability evaluations was to evaluate the current level of usability of these services, and how well the standard set of heuristics from Nielsen [13] works for sites with reputation information, or if they need additional rules of thumb. In the expert evaluations, we were focusing on the reputation information and how it is visualised in order to understand what works, what fails and how things could be improved.

As the visual prominence seems key for better utilisation of the reputation information, we introduce the idea of *visual nudging* for improving the usage and production of reputation

information to enable better and more informed decision-making. “Nudging”, a term introduced by Thaler et al as a way to enhance decision-making [19], in this context means that by enhancing the key elements of the reputation information that the user *should* be looking at in order to reach a good decision, we aim to gently influence the users’ behavior by focusing their attention in relevant direction. The visually prominent elements are intended to serve as nudges. A nudge can alter the users’ behavior in a predictable way without forbidding any options or significantly changing their economic incentives [19]. As indicated by our previous studies [9], nudging through the visual means could be most effective as visual elements are gaining the users’ attention. Further, better visualisation may also help to create more interest in contributing to the reputation information (commenting and rating), as currently the ratio between all users of a site and those who actually actively add to the reputation information is often quite low [add ref or take out].

We will first present the background for the current study, the previously conducted user studies together with the earlier work done in this area. We will then proceed with the usability evaluations for the additional websites and discuss the findings. We will conclude by summarising the lessons learned on what kind of usability issues we currently see as most pressing on the websites utilising reputation systems, and how they could be improved on, especially focusing on the key role of the visual elements and their prominence for the overall usability of such websites.

2. BACKGROUND

Reputation information is typically presented by both visual and textual means.

2.1 Visual reputation information

Currently, the most common way to present *visual* reputation information is to use star symbols to represent the current rating of the item under scrutiny (Figure 1). Other symbolic icons commonly used for visual reputation information include “thumbs up” or “thumbs down” and a scale consisting of circle symbols (Figure 2).

Most common representations of reputation information are used to communicate the popularity rate of the product or service based on users’ votes. Usually, the user is able to see the amount of votes given describing the popularity or how much the product is “liked”. However, this information is not revealing the *scale* of the information, and the user may be left with confusion: *What is the difference between three or four stars? How many stars a good product usually gets? How many ratings can be considered “a lot of ratings” in this service?* Because of this ambiguity, the quality of the reputation information is experienced as questionable: *What do the ratings actually mean (to me)? How credible are the ratings? How are the ratings calculated?* For the users, the transparency of the information [17][18] is missing.



Figure 1. Examples of usage of the star symbols as reputation visualisation in some popular websites



Figure 2. Example of other commonly used symbolic icons for reputation information

2.2 Textual reputation information

Possibly, partly due to all of these problems in the visually presented reputation information, the textual information is currently considered more important for the users: Reliance on peer reviews has become everyday news. For example, USA Today has recently reported the growing importance of peer reviews, stating that “customers are increasingly vocalising their experiences online for other travelers to read” [22]. In another article, online ratings and reviews were considered almost twice as significant as brand and reputation when choosing a hotel [21].

Online reviews have indeed become increasingly popular as a way to judge the quality of various products and services [4][8][11]. Even when popular and used, the textual reputation information has its own troubles. The basic usability problems related to how the information is presented hinder the efficient use of the reviews. The user is encountering a burden of finding the relevant information out of sometimes an excessive amount of textual feedback. Furthermore, in a recent study by Jurca et al [8], the reviewing behavior can also include a variety of biases.

2.3 Trust and risk

In the context of downloading, trust and risk perception also become an issue. For the online user, the perceived credibility of a website or a service has a strong impact on the trust level and risk perception [5]. As it has been studied before [1], visual or aesthetic factors are linked to a website's credibility – a good first impression, strongly based on the visual representation, can set the trust level towards the service in a matter of milliseconds [10]. Investing on a visually pleasing user interface (UI) has been found to enhance a positive user experience of web pages [7][14].

3. EARLIER WORK

In our earlier work [9][16], we have studied the basis of the actual usage, usability and the ways of utilisation of the reputation information in the context of websites that offer mobile applications for downloading. Our studies focused on two websites; 1) WidSets, which was a website for downloading and developing mobile applications (“widgets”), launched in October 2006 by Nokia (www.widsets.com) and 2) Nokia Ovi Store (www.ovi.com), Nokia’s Internet service offering services in various areas such as games, maps, music, and mobile applications. Ovi replaced the WidSets site in April 2009. Our study on Ovi focused on the part of the service offering downloadable mobile applications.

In the study for the WidSets website [9], we were focusing on the current usage of the reputation elements on the website. The results indicated that the *visually prominent UI elements* of the site acted as the main sources of information when making decisions about downloading widgets, while less prominent information was, for the most, overlooked. Therefore, we were able to conclude that any information that is de facto important for the decision making should also be presented as visually prominent in order to gain the users’ attention. The question of whether the elements should be *presented as an aggregation of the different elements or separately*, allowing users to utilise the information in a more independent fashion, could not be determined on basis of the studies and thus became one of the questions to be resolved by further studies.

As a direct continuation of the WidSets study, we conducted another study focusing on Ovi and how the online reputation information currently offered in Ovi is understood and utilised by its users [16].

Our results again showed that the reputation information available was not efficiently utilised. According to our interpretation, the *lack of cohesion* between the reputation elements hinders the understandability and use of the information available. Users also reported that they found the credibility and quality of the reputation information to be questionable, which may be the result of the inconsistent and ambiguous way of presenting the information. Users were currently not able to find the relevant information and thus also not able to form an overall view or an understanding about the content and the message of the reputation information.

Based on the results from these studies we suggested [16] that in order to help users making full use of the reputation information, a *visually prominent aggregation of the various reputation elements* would be helpful. According to our studies,

the users also preferred the decision making process to be “quick and easy”. Answering these demands requires efficient composition of information from different sources. As humans are experts in processing visual information, presenting the information visually, in graphical form is also likely to ease and enhance the information processing.

4. RESEARCH QUESTIONS AND METHODOLOGY

The previous studies showed that there is a lack of visual prominence and cohesion between the different reputation elements, and the reputation information was under-utilised. The findings led to the formulation of the following **hypotheses**:

- The websites offering reputation information had problems with usability;
- More specifically, the reputation information provided has bad usability;
- Visual prominence of the reputation elements is guiding the decision-making process on these sites;
- The visually prominent elements on the websites are “wrong”;
- Visual nudging is not working on the websites to enhance the decision-making process.

The basic **research question** behind the study is: “*Why is the reputation information underutilised?*” By addressing this research question, and armed with an initial understanding about the importance of the visual elements, we aimed at analysing how the reputation information is currently displayed across the selected sites.

Among the various **methods** available in the field of Human Computer Interaction (HCI), *heuristic evaluation* based on Nielsen’s heuristics [12] was chosen as the basic method to analyse the sites offering reputation information. The heuristic evaluation was complemented with *expert evaluation* focusing on the visual elements of the sites.

Heuristic evaluation is a form of usability inspection where usability specialists or other evaluators judge how the object of study, e.g. a website, passes on an itemised list of established usability heuristics [12][15]. Preferably, the evaluators are experts in human factors or HCI, but less experienced evaluators can also follow the heuristics checklist and produce a report of valid problems. Expert evaluation is a more free-form analysis of a given object under observation, based on the expert’s experience, often focusing on certain elements of the object [2].

With the evaluations, we aimed at gaining an understanding of the usability issues and to potentially formulate additional heuristics for reputation information.

5. THE STUDY

The websites chosen for the usability evaluation were well-known sites, and selected on basis of their general popularity¹:

¹<http://www.google.com/adplanner/static/top1000/#>,
<http://www.alexa.com/topsites>.

- Amazon (shopping), www.amazon.com
- eBay (shopping), www.ebay.com
- TripAdvisor (hotel and vacation reviews), www.tripadvisor.com
- LinkedIn (networking tool), www.linkedin.com
- YouTube (video sharing), www.youtube.com
- Yelp (reviews and recommendations for local businesses), www.yelp.com
- Digg (social news website), digg.com
- IMDb (movie and serial reviews), www.imdb.com
- NowPublic (social news website), www.nowpublic.com
- AppStore (Apple's store for iPhone applications). www.apple.com/iphone/apps-for-iphone/

The evaluations were performed by four evaluators: one senior HCI expert (> 10 years of experience), 2 experts (>2 years of experience) and one non-expert (< 1 year of experience). The expert evaluation focused on how the reputation information was presented on the selected sites.

6. ANALYSIS OF THE USABILITY EVALUATIONS

Table 1 summarises the outcomes of the usability evaluations against Nielsen's heuristics. We will now present the findings of the expert evaluations on the reputation information website by website, focusing on the main findings. The findings are marked either with 😞(negative) or 😊(positive).

Amazon

😞 The different pieces of information are presented similarly, as if having the same value (e.g. product details and important information). This makes retrieving information for the decision-making a hard task. (Figure 3).

Product Description
Super high-powered surveillance binoculars for long-range detailed viewing. Great armor absorbs shock while providing a firm grip. Contemporary styling; includes
[See all Product Description](#)

Important Information
Legal Disclaimer
We do not in any way represent that any part we sell is legal to possess in your J

Product Details
Product Dimensions: 8.4 x 8 x 3.6 inches ; 1.9 pounds
Shipping Weight: 2.6 pounds ([View shipping rates and policies](#))
Shipping: Currently, item can be shipped only within the U.S., and to APO/FPO ad support issues.
ASIN: B000092PMY
Item model number: 13-2050
Average Customer Review: ★★★★☆ (50 customer reviews)
Amazon Best Sellers Rank: #380 in Sports & Outdoors (See Top 100 in Sports & #3 in Camera & Photo > Binoculars, Telescopes & Optics > Binoculars)
Would you like to [give feedback on images](#) or [tell us about a lower price?](#)

Figure 3. Different types of information similarly presented

😊 The website presents the rating's information through a chart with detailed information about how many users rated the item and how, as well as a direct access to their reviews.

😊 Information about the seller is presented clearly.

😊 Users can access the list of top reviewers, i.e. the ones with the most useful reviews.

eBay

😞 Information about the overall purpose of the website is hard to find even when registering (statement of purpose).

😞 The user cannot sort other users' reviews about a seller by any other category except "date", the default category. In case a seller has both positive and negative reviews, the user will have to scroll through all the reviews to find the negative ones. This might be very time-consuming (Figure 4).

😊 Both the ratings about the seller and the way the feedback is calculated are clearly presented to the user.

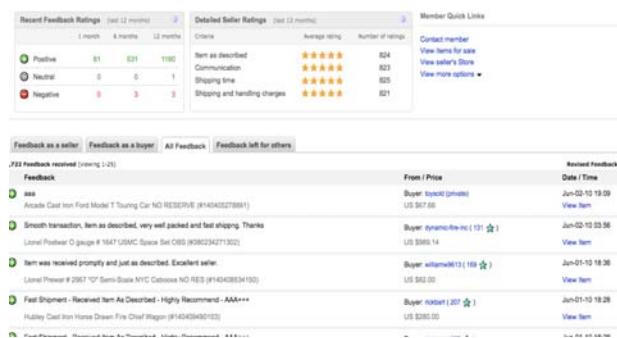


Figure 4. Sort reviews

TripAdvisor

😞 The visualisation of the rating system is ambiguous. A novice user might be confused by the two different ways of showing the ratings 1) thumbs and 2) circles. The actual meaning of the symbols becomes clear only by the time the user writes a review: thumbs are associated with a separate question - "would you recommend this to a friend?" (Figure 5); circles represent the rating.



Figure 5. Confusing information

😞 The number of reviews is not consistent. The addition of all the ratings provides a number, which is different than the one presented along with the written reviews and still different from the one obtained when the user clicks the "clear filters" option. This might jeopardise trust in the reputation system.

	Amazon	eBay	TripAdvisor	LinkedIn	YouTube	Yelp	Digg	Imdb	NowPublic	AppStore
1.	Visibility of system status	X	X	√		√	√	X	√	√
2.	Match between system and the real world	√								√
3.	User control and freedom	√ / X	X		√	X	X	√ / X	X	X
4.	Consistency and standards	X		X	√ / X	X	X	X		X
5.	Error prevention	√	√	√	√	X		√	√ / X	√
6.	Recognition rather than recall	X	X	√	√	√	√ / X	X		√ / X
7.	Flexibility and efficiency of use		√	√	√	√	√	√	√	√
8.	Aesthetic and minimalistic design	X	X	X	√			X	X	√
9.	Help users recognize, diagnose, and recover from error									
10.	Help and documentation	√	X							√

Table 1. Overall outcomes of the heuristic evaluation. The symbol √ was used when there were more good aspects than problems, the X was used when the problems were more than the good aspects and the √ / X symbols when the number of problems and good aspects was balanced

:(Information provided is not clear. For example the rating information provided for hotels consists of three different ratings (Figure 6).

:(The different elements of information are presented as having the same value, and without a clear structure to guide the user, which makes retrieving information a time consuming task.

:(The target of the reputation and the reputation elements were not easily distinguishable.

:) While reading the reviews, the user can see the reviewer profile with just a mouse hover, which provides an easy access to the information, prevents the disruption of the task and adds quality to the user experience.



Figure 6. Confusing rating information

LinkedIn

:(The UI does not provide a clear guidance of what are the goals of the website, how it should be used and what is the order of importance of the content. This information is hidden behind an unnoticeable link, which makes it hard for the novice user to detect.

:) The users' own recommendations are listed, enabling comparison between recommendations, and adding transparency to the system.

YouTube

:(After having rated a video as negative or positive, the user is not allowed to undo the action. This adds unreliability to the system especially as it is possible to click on the rating accidentally.

:(User is not allowed to delete a video previously rated as "Liked" from the "liked videos" view (Figure 7). The only actions allowed are adding it to a playlist or to a list of favorites. In order to delete a video previously rated as "liked" the user has to perform too many steps. First, the user has to open the "liked videos" view, add the selected video to a playlist or to favorites and only then remove the video. This is time consuming and counter intuitive as the user has to perform a contradictory operation – "add to favorites" - to the one they actually intend to perform.

:(The system does not provide a confirmation or an option to undo the action of reporting another user. This might generate

unreliability in the reputation information as users can report and be reported by accident.

There is specific statistical information about the history, popularity and spread of the videos, which contributes to the transparency of the website.

Information provided under "views" shows a detailed pictorial and statistical representation of activity frequency over time and per location.

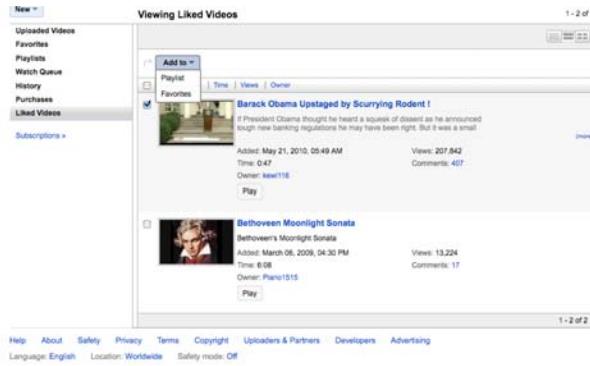


Figure 7. No delete option

Yelp

The users have access to the amount of reviews for a specific place but cannot see the relationship between other reviewed places. Even if all the reviews are positive and the place has a certain number of stars it does not provide information about its quality when compared to other places in the same area.

After rating a review as useful, funny or cool, the user is provided with feedback and the number of ratings is immediately updated, which evokes reliability in the system.

The system provides the option to undo the ratings to other users' reviews, which allows the user to correct potential mistakes and adds more trustworthiness to the ratings.

The website provides a graphical and clear explanation of ratings and ratings over time. It clearly details how the overall ratings are obtained.

The basic review contains plenty of information about the reviewers' reputation, making the relevant information immediately available to the user and the reputation of the review itself can also be seen.

By presenting diverse information about the reviewed target and the reviewer community on the first page the website guides the novice users and keeps their interest in exploring the website.

Digg

The main page does not provide information about what is "Digg" or how it works. The lack of directions might make the novice user confused about the purpose of the website.

Advertisements were presented as having the same value as the information the user was looking for.

The system does not allow the user to delete a previously provided comment.

The scale of the "Top" is ambiguous. The user is not able to distinguish the timeframe of the "tops" and might get confused.

When clicking the icon corresponding to the number of "diggs", the user is directed to a page presenting the comments. This is counter-intuitive since the user expects to see a list related to the number of "diggs", instead of the comments regarding the news. The "how many diggs"- icon is the most prominent element of the page, hence it should provide the expected information.

After digging an article the system provides good feedback and updates the results immediately, which contributes to the overall reliability of the system.

The site enables users to evaluate one another's comments, which might contribute to establish or strengthen the community feeling.

IMDb

If the user rates the same movie more than once the system provides a feedback message saying the vote was counted, which might be misleading.

The user profile, accessed through the username link, only contains a list of the reviews that the user has made. The more informative user profile is accessible through an additional link on the page presenting the users' reviews. This jeopardises the system's consistency.

The reputation information and the links to reputation information are presented among the general information about the movie. The information is mainly presented in the form of text. The first link on the page dedicated to the reviews is blended among the general textual information and the links, which requires an extra effort from the user in order to find relevant information and differentiate between different types of information provided.

User cannot distinguish the relationships between popularity and rating of the movies. The info button on MOVIEmeter (question mark) gives some additional information but does not resolve the issue as the users may have a hard time understanding how the percentages are formed and how to interpret them.

The website provides detailed user ratings, and allows the user to access information about the voting trends for specific categories.

The website uses weighted average for unbiased ratings, which eliminates the ratings that are only intended to change the overall rating in their benefit, adding reliability to the reputation information.

The website also provides links to external reviews, which contributes for the feeling of transparency.

NowPublic

Information elements and advertisements are hard to tear apart. The small boxes of information and advertisements create

a cluttered look for the UI and the vertical page structure does not support a natural flow of information retrieval.

 The "recommend" icon does not provide clear information about if the user is recommending the other member or their posts. This might affect the results, in case the users do not understand what is recommended (Figure 8).

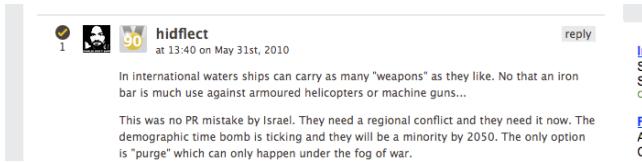


Figure 8. Misleading icon

 The website provides a guidance pop-up window for novice users as a starting page, which gives immediate information about the purpose and usage of the website.

 The website provides detailed and clear information about getting promotion by points and an explanation about the meaning of the user ranking.

 The members are given points according to different categories of posts. This motivates contribution as it might be seen as recognition.

 The ranking status of the members, based on their individual points, is presented visually and in a clear way.

AppStore

 An option to read more information in the reviews - expand text – is provided, but the user cannot go back to the condensed text, which can make the page cluttered.

 The site does not offer access to more details about the star ratings or all customer reviews unless the user uses the iTunes software to view applications.

 The user has no information about the way the ratings are formed except for the fact that they are based on the reviews.

 The user can easily sort the reviews by several categories that are provided on the left column. This adds efficiency and transparency to the presented information, as the user is able to easily find both positive and negative reviews.

 The website provides a list of accessories rated and suggested by staff, which makes it easy for a first time user to navigate through what is available in the store.

 When user clicks on a product, all information is provided in three sections – 1) a description with snapshots, 2) ratings and reviews by users and 3) Q&A section, with questions asked and answered by other users. This provides a complete and detailed overview of the products, contributing for transparency.

 The website offers visibility for the developer, which may enhance both the willingness to contribute and the trustworthiness of the contributions.

7. DISCUSSION

A general problem found in most of the analysed websites was a *cluttered UI* and the fact that the all available information was presented in a similar fashion as if having the same value, which may cause confusion and mislead the user: The *nudge to look at information that is relevant is missing*. The elements available are presented in a way that does not guide the users' attention to the relevant information while making decisions. Another main problem was related with the *lack of interrelation between the different reputation elements*. This has a negative effect on the information credibility provided by these elements. It may also affect the users' willingness to contribute as it is unclear how the contribution will affect the offering.

On basis of the usability evaluations, the current level of usability on the studied websites has general usability problems that are big enough to jeopardise the use of the sites altogether. Moreover, when it comes to how reputation information is currently offered, the level of usability can be described as remarkably low. Improvements in distinguishing and understanding different types of information available and visual nudges for how they should be utilised by the user in the decision-making process can easily be suggested:

- Clearly distinguish between distinct sources of information: the service provider, the reputation system, advertisements, other users and what is actually meaningful – highlight the relevant information and guide the users task-flow;
- Tie together the different instances of reputation information to form a coherent set of information where different elements support each other;
- Promote transparency: clearly show where the reputation information comes from and how it is formed.

There are also social aspects related to understanding, or accepting the information. The results of our earlier studies and those by others have indicated that reputation information available in textual format, in form of peer reviews in writing, has a big importance in online decision-making [9][8][11][16]. Although the quality of the reviews is sometimes seen as questionable as already discussed, reading peer reviews or comments undeniably is currently the most reported element to be used to make decisions online, when available. However, a closer look may reveal that users may report reviews as the main information source more readily than visual impressions, as users may not be able to reflect on their visual impressions that not only are hard to put into words, are also to a great extent formed automatically and unconsciously [10]. Because of this, users may over-report the importance of the textual information, and under-report the importance of the visual impressions, as they may not be fully aware of it.

Some ways to take all the above-mentioned aspects into account and enhance the utilisation of all reputation elements conjointly is likely to include creating visually prominent, real-time links between the users. When users are exposed to appropriate amount of social data about one another, it tends to increase the activity of giving contributions [6]. The user profiles should also be presented in a visually attractive and motivational way in order to promote participation and contributions [20]. By visual

nudges – making the relevant information visually prominent – users can be helped towards more sound and informed decisions in risky online situations.

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