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Polite Interaction Design: Capturing the Users Attention Without Compromising their Experienced Trust

Anna Sigríður Islind
Department of Computer Science, islind@ru.is

Sara Willermark
School of business, economics & IT, sara.willermark@hv.se

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Completed Research

Anna Sigridur Islind
Reykjavik University
Department of Computer Science
Reykjavik, Iceland
islind@ru.is

Sara Willermark
University West
School of Business, Economics and IT
Trollhattan, Sweden
sara.willermark@hv.se

Abstract

Pop-ups have been widely used to control users' attention, causing a high degree of irritation and dissatisfaction. We explore so-called 'polite' pop-ups, i.e., pop-ups implemented into the interface eliminating the intrusive and surprising factors. We hypothesize that: H1) Users pay less attention to, and interact less with, polite pop-ups than traditional pop-ups, and; H2) Users perceive a higher degree of trust in applications with polite pop-ups compared to traditional pop-ups. The research approach includes: i) comparative user tests with 88 participants; ii) observations of user tests; iii) assessment questionnaire, and; iv) data-driven analysis of interaction patterns. We analyze the data through the theoretical lens of trust and show that users pay less attention to, yet perceive a higher degree of trust. Our contributions include conceptualizing 'polite' design elements and the research agenda of *Polite Interaction Design* that aims to capture users' attention without causing unpleasant experiences or decreased trust.

Keywords

Polite pop-ups, Interaction Design, Safety, Trust, Attention, Interaction.

Introduction

Pop-ups have been considered a powerful way to catch the user's attention (Tasse et al. 2016). Even though pop-ups are associated with high attention levels and a considerably high click-through rate, they have also been shown to result in negative attitudes due to their intrusiveness (Hsieh et al. 2020). Due to that, they have been compared to distracting colleagues who insist on making conversation by constantly interrupting an ongoing work task, i.e., an unwelcome and disturbing element (Bahr and Ford 2011). Thus, pop-ups entail forced exposure as the users must interact with unwanted information before proceeding to the primary activity at hand (Edwards et al. 2002). From a user perspective, pop-ups have traditionally been associated with flashing, colorful and untrustworthy squares causing annoyance or other strong adverse reactions (Tasse et al. 2016). This type of third-party pop-ups, i.e., traditional pop-ups from external senders, were common in the late 90s but decreased as browsers came to offer the alternative of filtering them out. However, pop-ups are now making a come-back, yet in a different form (Bittner and Zondervan 2015; Willermark et al. 2020). This new form entails pop-ups where the website or the mobile application is the sender of the material, and they are neither flashy nor particularly colorful. These pop-ups have become a frequently occurring phenomenon in online marketing (Bittner and Zondervan 2015). As said earlier, research on traditional pop-ups shows that pop-ups often trigger a

negative user experience (Chatterjee 2008) and can cause users to leave the website (Bahr and Ford 2011) but although there is this new wave of less invasive pop-ups, their impact on the users, is yet under-researched (Bittner and Zondervan 2015; Willermark et al. 2020). What can be derived from the research on traditional pop-ups, users generally experience a high degree of irritation and dissatisfaction when exposed to pop-up boxes regardless of the design specifics, such as the size or shape of the pop-up window or when they appeared on the screen (Bahr and Ford 2011). As we see it, traditional pop-ups can be understood as what is usually referred to as 'persuasive design' elements today. Persuasive design elements are discussed as elements that are placed within the user interface with the sole purpose of grabbing the user's attention, and triggering behavioral change is a part of the design vision (Fogg 2009; Hassenzahl and Tractinsky 2006). Even though recent research on persuasive design has discussed design principles for designing persuasive technologies and persuasive design elements (Wernbacher et al. 2019), there is a significant conflict of interest between the company's desire to influence the user's attention on the one hand, and the user experience on the other hand (Tasse et al. 2016). Additionally, the impact on the users in a broader perspective is an interesting aspect to further explore and due to that, we discuss pop-ups, perceived safety, and trust here next.

Pop-ups, Perceived safety, and Trust in Technology

Different pop-ups have been developed, and these have been applied in various ways, where warnings and privacy-related messages placed in pop-ups are dominant in recent literature (Kitkowska et al. 2020; McGivern et al. 2019). These different kinds of pop-ups, which contain exposure to the user in various ways, can be summed up as; i) "Timed pop-ups," ii) "Scroll-pop-ups," iii) "Entry pop-ups," iv) "Exit pop-ups" and, v) "Click pop-ups" (Wernbacher et al. 2019). "Timed pop-ups" are activated after a specific time on the website, while "Scroll pop-ups" are activated when the user scrolls down the page a particular length (Mbugua and Ndavi 2021). "Entry pop-ups" are activated as soon as the landing page is fully loaded and thus is exposed directly to the user, and "Exit pop-ups" are activated when the user is leaving the page (Krushali et al. 2018). "Click pop-ups" are activated when clicking on a specific link, image, or word and constitute the only pop-up where the interaction is not imposed on the user (Loid et al. 2020). Due to that fact, we focus on click pop-ups in the paper. Tasse et al. (2016) have suggested that pop-ups could be placed in the interface within the visual field without the requirement for active action. They illustrate that doing so, will limit negative experiences related to pop-ups; these specific types are so-called 'modal pop-ups.' In this study, we explore a combination of the modal and the click pop-up through our 'polite pop-ups,' i.e., modal click pop-ups implemented into the interface, within the visual field where the intrusive and surprising factors are eliminated, and active action from the user is not a requirement. Such a design approach will most likely be at the expense of the users' attention concerning the pop-up and their interaction with the pop-up (i.e., by clicking on it and engaging in the content). Thus, pop-ups that harmonize with a website or a mobile application design and lack the surprising, persuasive design elements will most likely not be as eye-catching. Still, Tasse et al. (2016) argue that there are reasons to believe that it would constitute a more appreciated and accepted way to influence users. A recent study shows that the perceived irritation that adults often report regarding pop-ups, does not affect children in the same way. The entertainment value of pop-up ads positively impacted the children's user experience (Abbasi et al. 2021). Another recent study shows that pop-ups that include incentives and inferring credibility through aesthetics can positively impact user experience, whereas audio and irritating colors in the design decrease the user experience (Hussain et al. 2021). On a similar note, Sundar et al. (2020) show that product aesthetics can be linked to a belief in efficiency and product performance and (Sundar and Cao 2020) find that both language used, as well as the way the product feels, and how trustworthy it feels to use, can be linked to the trust in both the brand as a whole and the product. Their research is on physical products, while our paper focuses on digital products.

Regarding online trust, Lee et al. (2006) link trust to a variety of aspects derived from the way that the product or service at hand feels to the user. Moreover, consumer perception regarding advertisements from a specific brand, has been linked extensively to their intention to come back to that brand (Kim et al. 2010), and trust in the source has even been shown to influence treatment decisions that patients make, i.e., if they find the source trustworthy, they are prone to decide on the proposed course of treatment (Oxman and Paulsen 2019). Furthermore, technologies that interact with the users in human language build trust upon human-like trusting attributes such as ability, benevolence, and integrity (Gulati et al. 2018) and system-like trusting attributes, such as functionality, helpfulness, and reliability (Mcknight et

al. 2011). Due to the apparent interruption and lack of control that traditional pop-ups bring to users, pop-ups can be linked to a lack of trust in the technology, which can even extend to the brand and those aspects are crucial elements of the user experience (Gefen et al. 2003; Lankton et al. 2015; Pavlou and Gefen 2004). Thus, it is particularly relevant to explore trust concerning pop-ups, as traditional pop-ups have been proven to cause irritation, suspicion, and distrust among the users (Bahr and Ford 2011; Tasse et al. 2016). Lippert (2002) argues that trust in technology can be understood as the individual's willingness to be vulnerable to the technology based on predictability, reliability, and utility expectations and influenced by an individual's predisposition to trust in technology. From this, it can be concluded that trust is an important factor when designing technological artifacts, however, little research has focused on how perceived security and safety in interactions with a technological artifact, are linked to trust. Based on that, this study explores trust in technology by researching the perceived safety of modal click pop-ups. As we see it, exploring safety, and researching the perceived safety with ties to trust, allows us to break down trust in technology into a measurable component. Based on the work outlined, we hypothesize that: **H1)** Users will pay less attention to, and interact less with, polite pop-ups than traditional pop-ups, and; **H2)**; Users will perceive a higher degree of safety in an application that uses polite pop-ups compared to conventional pop-ups. Our main contribution is in terms of the conceptualization of 'polite' design elements and through that conceptualization we launch the new research agenda of polite interaction design, that aims to capture users' attention without causing unpleasant experiences or decreased trust.

Methodology

This study draws from a comparative study of two prototypes of mobile applications (more specifically, two prototypes of mobile applications, which could also be used in a web browser). One prototype included polite pop-ups, and the other prototype included traditional pop-ups. The research approach builds on a mixed-method that consists of both quantitative and qualitative data, providing a rich understanding of the user's attention and trust in the technology of the two prototypes. The research approach involved: 1) user tests; 2) observations of the user tests; 3) an assessment questionnaire; 4) a data-driven approach through an analysis of interaction patterns recorded by google analytics. Steps 1 through 3 were conducted in the given order and during the same occasion. In contrast, the analysis outlined in step 4 was conducted after the user testing sessions in collaboration with the authors. The study included 88 participants in total, and the participants were recruited through a snowballing method where the starting point of the inclusion pool was a university course. The participants' age ranged from 15 to 68 and included 52 men and 36 women.

User tests and the two prototypes

The authors of this paper designed the two prototypes of simple online shopping and the user flow which we designed as part of the experimental setup, was only designed for this study. The prototypes were set up as hybrid applications, meaning that the participants in the user tests could use their device (independent of the operative system) to navigate to the prototypes to mimic an authentic mobile situation as much as possible. The design of both prototypes was responsive, meaning that the design and layout adapted to the user's screen size. Of the 88 participants, 51 users navigate from a smartphone and two from a tablet, 75% of those from an Apple device. The remaining 35 participants navigated from a computer (71% of those using an Apple computer, and 83% used the browser Google Chrome).

Figure 1 shows the two prototypes and their respective pop-ups. All participants answered the question of perceived safety with five response options ranging from "Strongly Agree" to "Strongly disagree". Furthermore, attention is measured through the questionnaire that all participants filled out after completing their user test. The users did a think-aloud test, and their path through the application was predefined, and the same for all participants.

The user test was a between-subjects study experiment that randomly assigned different user interfaces to various test participants. As a result, each test participant interacted with one user interface. The purpose of the user test was to expose the participants to the independent variable (the pop-ups) and identify its possible effect on the dependent variables (attention, interaction, and perceived safety). The participants were asked to engage in the applications according to exact instructions and do a think-aloud walk-through while testing. The task included the following steps. The button on the first screen leads the user to the next screen and so forth (see Figure 1 for an overview). The participants were asked to make an

Figure 1. The first prototypes were with the polite pop-ups and the second one with traditional pop-ups.

order of one product, in the figure below, a drink order is shown. They were first met by a login screen, where they logged into the application. The following step included browsing through the available (called pop-up 1 in Figure 1) products and finding a particular smoothie. On that screen, they were met by the first modal pop-up. After that, participants were asked to find the nutrition definition for that particular product. As they scrolled through, they would reach a button where they could proceed. Once that button was clicked, the following screen included their purchase, where the second modal pop-up was located (called pop-up 2 in Figure 1). The following step included quantity and specifics on their order. Once the user would proceed, they were transported to a help screen. That particular screen included the third and final modal pop-up (called pop-up 3 in Figure 1). All 88 participants were given the same task list. By giving the participants a clear directive with a specific task to perform the participants navigated within the applications and would be exposed to each stimulus. To isolate the independent variable, the applications were designed with an identical interface and content. Each user test was conducted in privacy (except for the observer) to ensure as natural an environment as possible. The user chose their device and then they were informed that the application at hand was a mobile-first design that was designed responsively. The aim was to recreate such an authentic situation as possible, using a familiar environment and realistic instructions with a reality-based purpose. The participants were initially informed that they would test and evaluate a prototype of an application. The participants were asked to navigate the prototype of the mobile application while observed and answer a written questionnaire. Initially, we camouflaged the user test so that participants were not aware of its primary purpose and thus did not actively reflect on the perception of the pop-up (Bryman 2015). They were neither informed of the role of the pop-up nor that there were different types of pop-ups in the two prototypes. This is to avoid comparison and inhibit the authenticity of the situation. Furthermore, the participants were informed that they could at any point end their participation. Informed consent was obtained from parents or legal guardians of the children who participated. The user tests were carried out during the fall of 2019. The aim when designing the prototypes was to promote the experience of an authentic application (see Figure 1), by attempting an easy-to-navigate and visually attractive interface design. Hoping to generate interaction with pop-ups, both prototypes containing nine main views were created including 1) a start screen, 2) a selection screen and; 3) a product screen (with pop-ups number 1), 4) a cart screen, 5) a finalize purchase screen, 6) shipping information screen (with pop-ups number 2), 7) a sign-up screen to enable location, 8) a screen where location, camera and voice services were enabled (with pop-up number 3) and 9) a help-desk screen. If the pop-up number 1 on screen 3 were activated by clicking "yes", then the price shown on screen 4 would be reduced. If the pop-up number 2 in screen 6 was accessed, then screens 7, followed by 8 would be activated depending on the choice made. If the pop-up number 3 in screen 8 was accessed, screen 9 (with help) would be activated. If 'no' was clicked on any pop-up, a "thank you" screen (a 10th screen) was instigated (not shown in Figure 1). The color and shape of the click pop-ups differed visually from the surrounding environment (see Figure 1). This is to stimulate the visual ability that makes the memory of the information easier to recall (Bittner and Zondervan 2015).

Observations

The observations were documented by observation notes and 'think-aloud protocols' which involved the participants talking through their experience aloud while they were conducting the user test. The participants were asked to say whatever came to mind as they completed a task, e.g., by expressing what they were looking at, what they were thinking, doing, and feeling. This gave the observers insights into the participant's cognitive processes by making thought processes as explicit as possible during task performance (Fonteyn et al. 1993).

Assessment questionnaire

After completing the user test, the participants were asked to conduct a written assessment questionnaire. The questionnaire included qualitative and quantitative assessments. The questionnaire contained questions regarding the prototype in general and the pop-ups in particular. The questionnaire was both built up by SUS (System Usability Scale) which measures usability, and by user experience battery (AttrakDiff) in terms of multiple-choice questions and by open-ended text questions to further explore their perceived safety and experienced trust in technology. Furthermore, we specifically asked the participants to rate the overall trust of the application on a scale and write their reflections.

Data-driven approach

The data-driven approach included data collected through Google Analytics. We connected Google Analytics to both applications before conducting the user tests to be able to follow the user behavior closely and to explore how much time the users spent on each screen, to understand if one pop-up was particularly difficult, or would trigger more drop-offs in comparison to other screens.

Data analysis

The data analysis involved all the data gathered through the four data-gathering steps outlined here next. The observational data were analyzed with an observation protocol based on what actions participants made (navigation patterns and clicks) as well as the frequency and duration of different actions. These actions were analyzed by each of the authors and then brought together for a second analysis step which was conducted in collaboration between the two authors of this paper. Furthermore, we explored whether the participants chose to dismiss the click pop-up after activating it, or if they took further actions by participating in the suggested contest or using a discount, which is referred to as 'active engagement'. The analysis of the questionnaire was done in SPSS, first through descriptive statistics and then through a non-parametric Friedman test. The data from the questionnaire was analyzed based on all the participants' responses, regarding experienced behavior in interaction with, and preferences of, each prototype. Furthermore, the questionnaire also included qualitative answers. The qualitative data therein was coded and analyzed using content analysis to interpret the user experience. Besides, the relationship between the participant's responses to the questionnaire and their actions during the observation was traced and discussed between the two authors. The fourth set of data was derived from Google Analytics. The data from Google Analytics was used to further develop an understanding of the usage behavior and path through the prototypes through a data-driven approach based on clicks and the aim of that analysis was two-fold; i) to shed light on if the two prototypes were comparable based on collected usage behavior and path from all users in each of the prototypes and ii) to validate the findings derived from the observation protocols. Different interaction patterns were mapped through interaction analysis and the points where the participants dropped out of their user tests were coded and seen as of special interest for determining if the prototype tests were comparable at all. Finally, the quantitative results, the qualitative content analysis, and the usage behavior and path through the prototypes derived from Google Analytics were combined, and the user behavior was categorized and discussed among the two authors, as a part of the final analysis step.

Results

The user test resulted in a total of 4,925 clicks (counted as 'page-views in Google Analytics, representing in practice total interactions through clicks in both prototypes), with an average screen view of 24

seconds. When the users were asked to describe their overall experiences of the interaction design it seemed aesthetically pleasing and the participants did not see the interaction design per se, as a problematic aspect during the user tests. Both groups gave positive reviews, for example; *"The cute and welcoming face of the logo in the on-boarding part was wonderful."* (User testing the prototype with the polite pop-ups). Another participant stated: *"I liked the overall color scheme."* (User, traditional pop-ups). Below, we account for the result related to each of the hypotheses.

H1) Users will pay less attention to and interact less with polite pop-ups compared to traditional pop-ups.

A total of 47 users conducted the user test on the prototype that included the polite pop-ups. Out of the 47 users, 36 (77%) stated that they paid attention to (i.e., could recall) one or several pop-ups during the user test, while 11 (23%) could not remember any pop-ups (see Figure 2 and Table 1).
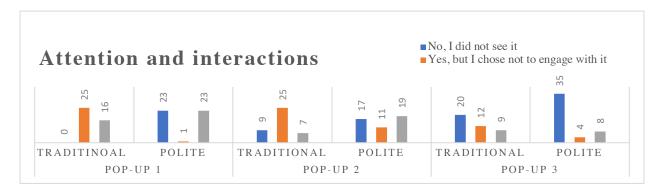

Figure 2. The participants' attention and interactions with the two prototypes and three pop-ups, indicated in numbers of participants (N=88).

A total of 41 users conducted the user test that contains the traditional pop-ups and all stated that they paid attention to one or several pop-ups. The results support the hypothesis that users paid less attention to and interact less with polite pop-ups than to traditional ones even though polite pop-ups also had an excellent ability to attract users' attention yet resulting in less interaction. The differences in the material showed significance (One-way ANOVA, Friedman's test) for Pop-up 1 (Asymp. Sig. ,002) and Pop-up 3 (Asymp. Sig. ,009) yet not for Pop-up 2 (Asymp. Sig. ,0985).

	Pop-up 1		Pop-up 2		Pop-up 3	
	Traditional	Polite	Traditional	Polite	Traditional	Polite
No, I did not see it	0%	49%	21%	36%	48%	74%
Yes, but I chose not to engage with it	60%	1%	60%	24%	31%	9%
Yes, and I chose to engage with the content	40%	50%	19%	40%	21%	17%

Table 1. The participants' attention and interactions with the two prototypes and three pop-ups indicated in percent of participants. (N=88).

H2) Users will perceive a higher degree of safety in an application that uses polite pop-ups than traditional pop-ups.

The prototype with the polite pop-ups was ranked higher than the prototype that had the traditional pop-ups, however, there was no significance (Asymp. Sig. ,147). Y-axis shows the number of participants.

As for the prototype that included the ***traditional pop-ups***, then a recurrent type of comment was that it was: *"beautiful with devilish functions"* or *"it was a very frustrating app, but looked nice"*. This opinion was a recurrent theme. Regarding the pop-ups in particular the participants expressly addressed them, as illustrated by: *"I was skeptic about the pop-ups"*, *"I hated the pop-ups",* or *"really disliked the intrusive*
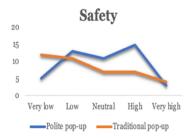
Figure 3. The participants' perceived safety of the prototypes. Blue: N=47, Orange: N=41.

pop-ups". Some were milder in their comments about the pop-ups as illustrated by; *"[w]ell, the pop-ups did not bother me, I just clicked them, and they went away"*. An interesting aspect was lifted by one of the participants, who discussed the pop-ups as a boundary issue: *"My boundaries were not being respected"*, and the participant elaborated on the meaning of that: *"when the pop-ups just appear without me being able to decide if I want to trigger them, I feel violated. I should be able to choose if I like a discount or not."* Another participant shared similar concerns as illustrated by: *"I felt like I was at a dead-end when the pop-ups came up, I did not want to proceed."* A clear assumption that can be drawn from the empirical data gathered on the prototype that included the traditional pop-ups is that the participants saw the pop-ups, felt forced to interact i.e., click them (and did express that option as a missing option in table 1), and thought that the pop-ups clouded their trust in the application.

When it came to the overall user experience of the prototype that included the ***polite pop-ups***, then the participants were in general not showing frustration (see Figure 3). Those that did notice the pop-ups express their thoughts on them, for instance, one participant said: *"It was easy to turn on the location and was really easy to see what products were included in the discount"* and another participant said: *"the location pop-up did not irritate me, but saying yes to giving away my location did not make me feel very good though"* a comment which we analyze as saying more about the intrusiveness of being tracked, rather than the polite pop-up itself. One participant was skeptical about the polite pop-ups and did not know what would happen if they were clicked. A participant said that he was unsure what function clicking would unlock and thereby was unsure whether to click it or not even though the discount did appeal to him. A clear assumption regarding the prototype that included the polite pop-ups is that an important proportion of the participants did miss the pop-ups (as discussed as a part of hypothesis 1). Those that did see the pop-ups, engaged with them, and in general, their trust in the application, was not negatively affected even though the pop-ups were there, and were interacting with them. These results thereby support the hypothesis that users will perceive higher trust in an application that uses polite pop-ups compared to traditional pop-ups in the data yet show no statistical significance.

Discussion

This study contributes to research on the 'mundane' and the details of day-to-day interactions with computers (Willermark et al. 2021). In previous research regarding traditional pop-ups, there is a high degree of perceived irritation dissatisfaction, and low commitment to pop-ups (Bahr and Ford 2011). However, the result from this study indicates a positive attitude towards our 'polite pop-ups', which differ from the traditional pop-ups that have been described in previous research. The participants in this study show active interaction which contradicts previous studies that state that pop-ups are only perceived as interruptions and that they are to a large extent ignored by users (Bahr and Ford 2011). A large portion of the participants who interacted with any of the polite pop-ups interacted with additionally polite pop-ups presented in the prototype or visited the same one again. That particular behavior pattern, and active engagement, can be interpreted as either i) that the participants needed clarification, which led to a return visit to the same box, or ii) that the information they previously encountered in one click pop-up was interesting and resulted in them visiting additional click pop-ups. This is in contrast to Bahr and Ford (2011) study, where the participants associated pop-ups with the information they did not want to take part in and began rejecting them. The notion that the polite pop-up was not rejected by the participants in our study is based on the fact that those that saw the polite pop-ups stayed at the polite pop-up during a sufficiently long time span to take in the material and evaluate the content and noted them in the think-

aloud part of the user test. The long time-span, and elimination the surprise from the pop-up elements can be linked to the concept of trust in technology (Lippert 2002). The mean of the period when clicking the polite pop-up, before closing it was 6.4 seconds in our study, whereas Bahr and Ford (2011) claim that it takes about 1.3-1.5 seconds for the user to take in the contents of a pop-up. In comparison, the traditional pop-ups were dismissed and closed in 1.1 seconds (the mean period), which is in line with the findings of Bahr and Ford (2011). A reasonable assumption is thereby that those participants that chose to interact with the polite pop-ups in our study certainly took in the content as they were exposed to the polite pop-ups for a sufficiently long time, which indicates a great probability that they considered the content as worthy enough to spend time on.

The position of this paper is that polite pop-ups are a far more effective interaction design approach when compared to the persuasive design embedded in traditional pop-ups. Interaction that is forced upon the user is a notion that belongs to the past and designers of today should instead pursue a polite design approach. This is in line with the discussion on democracy and end-user participation that has been a withstanding topic within the Scandinavian tradition of participatory design where end-user participation and engagement are forwarded as key aspects in the design process (Ehn 1993). The collaborative creativity where the users are engaged as a part of the design process (i.e., as a collaborative agent or actor in the design process) is thereby not something new. Instead, that has been the guiding philosophy of participatory design for 50 years (Islind and Willermark 2022). However, what we propose in this paper is that democracy is extended, and constantly considered both during design, but also when the applications are in use, and when small elements are to be added to an existing design, small elements like pop-ups. In those cases, we urge designers to think about the users, as small elements of persuasive design can affect the perceived safety and the overall trust in the application, which can even extend to the brand. The features contributing to polite pop-ups are essentially the opposite of persuasive design elements and include the following design features; i) inherently subtle and polite, ii) implemented into the interface, iii) in the same color scheme as other interface-related elements, iv) not intrusive. Lastly, we are critical of using persuasive design elements where the level of persuasiveness is high and encourage designers to join the use of our research agenda of *polite interaction design*. Our research agenda aims to capture users' attention without causing unpleasant experiences or decreased trust. We want to forward three main design implications, which can be used to guide polite interaction design in general, and future designs of polite pop-ups in particular.

Design implications

The design implications of this study are a less invasive and more polite design approach as polite pop-ups are more likely to be interacted with than traditional pop-ups. The results also indicate that the users interact with the pop-ups if the content is of value to them. We are entering into a new era of pop-ups where the polite pop-ups are not perceived as irritating to the users, and they trigger an active engagement when the content of the pop-up is perceived as valuable for the users. *1) Designing for grabbing the attention of the users who are likely to interact with the attention grabber:* The polite pop-ups are less flashy and will therefore go unseen by some. However, what our study shows is that those users that are interested in the content are more perceptive and see the polite pop-ups, click on them, and show active engagement. Ergo, the visual detection of action is linked to the users' interest. Consequently, using a polite pop-up will not grab all users' attention but grab the attention of those willing to interact. Doing so will entail a positive user experience. *2) Designing for a democratic interaction entails a higher level of trust:* Designing for an overall democratic interaction will affect all aspects of the application, even the perception of the interface design is perceived as more aesthetically appealing. Using less intrusive design elements, and by being polite to the user, leads to higher perceived security and safety, which in turn leads to improved trust in the application.

Limitations and future work

This paper has limitations that should be noted, and that also can serve as areas for future research. *First*, the user-test constitutes a constrained situation, and thus a direct application of study findings into real-life situations should be carried out with caution. *Second*, the study involves a relatively small sample size and lacks statistical significance in several cases. *Third*, to recreate as authentic an experimental situation as possible, the participants in this study were allowed to use any devices. Different devices provide

different experiences, especially with a mobile-first design. Various factors associated with the device type (i.e. screen size, user comfort, efficacy) may add extra variability to the observed outcomes. Therefore, we stress the importance of more studies that explore ways to capture users' attention without compromising their trust in general and more studies examining user experience of polite versus traditional pop-ups.

Conclusions

We have explored the user experience of what is referred to as polite pop-ups, i.e., the pop-up that is implemented into the interface where the intrusive and surprising factors are eliminated and compared to a prototype that includes 'traditional' pop-ups. The results show that polite pop-ups can be used as a substitute for traditional pop-ups, and that polite pop-ups reduce negative perceptions otherwise associated with traditional pop-ups. The higher perceived trust of an application that includes polite pop-ups is however at the expense that all users will not pay attention to the polite pop-up, and thus not interact with them. Still, most of the users who did notice the polite pop-up willingly chose to interact with the information in the polite pop-up, i.e., proved susceptible and chose to engage with the content and stayed for a longer time. Considering that, we propose three design considerations that can be used as a guide for the future design of polite design elements, like polite pop-ups. Finally, we suggest a new research agenda of 'Polite Interaction Design' for the era which can be seen as increasingly moving from persuasive design elements, towards a politer and increasingly considering an approach to design, used to afford certain human-computer interactions mildly, i.e., that is not perceived as intrusive and an approach that triggers a positive reaction, better user experience, and higher perceived trust. We hope that others join us in exploring different aspects of polite interaction design.

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