

Online Survey on Novel Designs for Supporting Self-Reflection and Emotion Regulation in Online News Commenting

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ABSTRACT

Uncivil commenting on online news is regarded as a persistent and complex sociotechnical issue. Because commenting behavior is inherently conditioned by user interfaces (UIs) on news sites, HCI scholars may approach the issue by proposing alternative UI solutions and thereby potentially mitigating incivility. This paper explores eight novel UI design proposals that aim to support emotion regulation and self-reflection during commenting and reports how the designs are evaluated in an international online survey (N=439) among online news commenters. This exploratory study advances our understanding of what kind of UI solutions, from the end-user's perspective, appear desirable—and why—in terms of improving the quality of online news commenting. For example, desire for moderation was found to predict more favorable ratings of the design proposals in general.

CCS CONCEPTS

• **Human-centered computing** → **Interaction design theory, concepts and paradigms.**

KEYWORDS

Design Research, Design Fiction, Social Media, Emotional reflection, Design conventions, Online Survey

ACM Reference Format:

Joel Kiskola, Thomas Olsson, Aleksi H. Syrjämäki, Anna Rantasila, Mirja Ilves, Poika Isokoski, and Veikko Surakka. 2022. Online Survey on Novel Designs for Supporting Self-Reflection and Emotion Regulation in Online News Commenting. In *25th International Academic Mindtrek conference*



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Academic Mindtrek 2022, November 16–18, 2022, Tampere, Finland
© 2022 Copyright held by the owner/author(s).
ACM ISBN 978-1-4503-9955-5/22/11.
<https://doi.org/10.1145/3569219.3569411>

(Academic Mindtrek 2022), November 16–18, 2022, Tampere, Finland. ACM, New York, NY, USA, 35 pages. <https://doi.org/10.1145/3569219.3569411>

1 INTRODUCTION

The communication culture in digital media services has been widely problematized, with scholars referring to issues such as social media rage, use of uncivil language [15, 68], and increased hate speech [30]. This has motivated various approaches attempting to mitigate online incivility, ranging from human-based content moderation [24, 51] to the computational detection of hate speech [14] and toxic language [46]. In this paper, we focus on online news commenting as a specific form of interaction in digital media, where incivility has been found to harm both the readers of news articles, journalists, and moderators [3, 38, 39, 43, 69].

It is well established that online discussion is shaped and conditioned by the computer-mediated nature of communication [9, 53, 65]. From the perspective of emotion psychology, the current largely text-based interfaces may limit the ability to control one's emotions and empathize with other people [59, 64]. Emotion regulation refers to the process and strategies that influence the quality, intensity, and timing of the experienced emotion [28]. The need for emotion regulation arises when emotions are of strong intensity, duration, frequency or wrong type for a particular situation, or they maladaptively bias cognition and behavior [28, 42]. It is likely that especially the attenuation of emotion regulation online is associated with factors identified in the Online Disinhibition effect by Suler [58]. Accordingly, for example, anonymity, invisibility, asynchronicity, and minimization of authority in online communication may result in shift in processes of affect and cognition so that they function differently than in in-person interaction. Consequently, it has been proposed that improvement of communication culture in digital media could be approached also by rethinking how user interfaces can support individual users' emotion regulation [62].

While recent HCI literature features some design speculations of alternative UIs [27, 37], there is little understanding of the user-centric quality of the envisioned UIs. To understand which UI alternatives would be 'better' for a diversity of potential users we need

empirical studies that utilize multiple perspectives of evaluation, explore a variety of design alternatives, and involve an extensive representation of potential users. Also, it is necessary to study what the users anticipate would happen if designs were deployed. In general, what the users anticipate of products can play a central role in shaping their experience [36]. If the users first react negatively and anticipate the designs would not work, this likely affects an actual test of the effectiveness. Furthermore, it is not reasonable to test different alternatives the first time in realistic news commenting environments because of the risk to the news site's reputation and the risk that the design makes the situation worse [37]. To this end, the paper explores eight design proposals to support self-reflection and emotion regulation in the context of online news commenting and reports on an evaluation study of the designs. The designs build on the idea of affect labeling, that is, identifying and explicating the emotional elements in comments or by asking the user to name how they feel [63]. The designs apply different metaphors and design concepts. For example, a virtual audience is shown reacting to a comment as it is written; and potentially problematic published comments are marked with a symbol.

The evaluation study was implemented as an international online survey ($N = 439$) among people who comment on online news sites. We asked each respondent to evaluate two designs. Also, we asked the respondents for background details, for example, to rate their experiences regarding comment moderation. In the results, we first examine quantitative ratings of the designs. Second, we explore the possible reasons behind the ratings by investigating both quantitative associations between the ratings and background variables and the open-ended answers of the survey.

2 RELATED WORK

2.1 Uncivil Online News Commenting is a Difficult Problem to Approach

Online news commenting is a form of public discourse between strangers [15] that takes place around journalistic content on comment sections of online newspapers or broadcasters' websites. The negative aspects of online news commenting, and their consequences have motivated conceptual work and empirical studies with respect to both the reasons for regulating and tools with which to regulate the tone of discussions (e.g., [12, 15, 39, 70]). In addition to harmful effects for the involved commenters, uncivil comments on online news can hurt journalists and moderators, who cannot easily avoid them [22], harm the publisher's brand [49], and have negative effects on readers who do not participate in commenting [12].

Incivility in online news commenting platforms can be approached from many angles by moderators and designers. Ruckenstein and Turunen [51] identify two logics within content moderation on commercial platforms: the logic of choice focuses on finding and deleting uncivil or 'insufficiently neutral' messages, while the logic of care tackles disorder with moderator-writer interaction. The logic of choice is seen in action in the form of users flagging messages, publishers putting up paywalls, limiting the number of characters in posts, and using algorithmic moderation to quarantine or delete messages (see also [26]). However, Ruckenstein and Turunen argue that the logic of choice fails to encourage behavioral change. Within

the logic of care, moderators attempt to improve discussions by educating users or by persuading them to reflect on their commenting. The drawback is that human moderator-driven approaches are costly, difficult to scale, and emotionally stressful for moderators because they must confront emotionally troubling writing. This highlights the need for also technological and scalable approaches to this issue.

2.2 Technological Strategies for Preventing Incivility

Because of the difficulty and expense of human moderation, media companies and researchers have looked for potential technological and user-interface solutions to preventing incivility. The Norwegian Broadcasting Corporation has incorporated custom-built quizzes to confirm that a user has read an article before commenting on it [29]. While this is a relatively low-cost solution, it is time consuming to apply to each news article and discourages some forms of civil commenting, such as quick replies [29]. Another approach is the psychologically "embedded" CAPTCHAs (i.e., challenge-response tests used to determine whether or not the user is human) containing stimuli that prime participants' positive emotions [53]. The authors found that priming increased the positivity of the tone of texts in online commenting. However, as they point out, there are ethical issues involved in influencing users in a "stealthy, covert fashion". Bossens et al. [4, 5] studied the effect of interface designs on online news commenting civility. Their designs directed the users to comment and share their opinion on a particular statement (relevant to the news article). The researchers found that their designs caused the comments to be more civil compared to a control where the users were only asked to leave their comment on the news article. However, as the researchers noted, directing users to comment on a particular statement may not work or be reasonable for all news articles.

Solutions based on computational approaches, such as machine learning, are also being developed, particularly to address the issues of cost and the demand for scalability. For example, Perspective API, developed by Jigsaw [34], can detect "toxic" writing to some extent, and this can be shown to the writer as a score or an emoji or made to trigger a notification that attempts to persuade the writer to reflect on their writing. Reportedly, triggering a simple text-based nudge asking the user to edit their comment can increase the percentage of approved comments by 2.5–4.5% [54]. Thirty-four percent of users chose to edit their comment before sending it upon seeing the nudge, and 54% of them changed it in such a way as to render it "immediately permissible" [54]. In addition, there are solutions for monitoring the tone of writing that people can install as add-ons on their web browsers. For example, Grammarly [25] attempts to detect 19 different tones (e.g., excited, egocentric, and accusatory) with the help of machine learning. The add-on illustrates the detected tone of the writing with an emoji that is placed inside the text-input box.

Algorithmic approaches may also be used to show the readers a sentiment analysis of published posts and threads, which may make some users stop and think before commenting. Such approaches include sentiment analysis on Yahoo News [45] and Gremobot chatbot emotion regulator [48]. Yahoo News has used a row of three

small emojis and percentages to visualize the overall sentiment of comments (see also [45]). The GremoBot chatbot emotion regulator supports emotion regulation in group chats by interpreting the situation positively and visualizing group emotion [48]. The results of their study “suggest that a chatbot emotion regulator can enhance positive feelings and alert people of negative situations”.

Overall, while the previously mentioned algorithmic solutions and tools appear promising, we argue that the solution space remains unexplored. As the problem of uncivil commenting seems to persist regardless of various interventions, we argue for further exploration from the viewpoint of UI design.

2.3 Supporting Self-Reflection and Emotion Regulation

The following elaborates on the theoretical foundations of our design exploration. To complement the logic of choice and the logic of care [51] and to address the aforementioned limitations of the existing solutions, we have suggested a third approach [37]: supporting user self-reflection and emotion regulation with the help of the identification of emotional elements in comments or by asking the user to name how they feel.

Recently, the concept of affect labeling, as an implicit form of emotion regulation, has been discussed in psychology literature [63]. Several controlled laboratory studies have found that emotional experience can be attenuated by simply putting one’s own feelings into words or labeling the emotionally evocative aspect of a stimulus [63]. In addition, Fan et al. [19] analyzed the emotional content of the tweets of 74,487 Twitter users and found that emotional intensity decreased rapidly after their explicit expression in an “I feel” statement.

The present work continues our previous work [37] in taking the idea of affect labeling as an inspiration, rather than a boundary, and exploring various tactics to make users more aware of their own emotions and the emotional elements in the messages. Also, we have limited our exploration in the sense that we do not intend to make definitive judgments on comments’ civility or to argue that making passionate arguments is wrong. This aim arises from the knowledge of how difficult it is to accurately define the limits of (in)civility or “the freedom of expression” [51]. There is long-standing discussion on the (in)civility of public discourse [20, 31, 50], including debate on whether dispassionate deliberation is synonymous with the legitimate expression of public opinion [20].

To further position our work, we recognize that the idea of supporting self-reflection and emotion regulation relates to the theory of nudging [60]. The nudge theory proposes that peoples’ behavior can be influenced with indirect suggestions and positive reinforcement. In general, computational affect labeling could be an approach to nudging (toward emotion regulation) because it gently informs or guides the user while preserving their freedom of choice. However, we are aware that nudging has its risks. For example, nudging may feel patronizing in this context.

3 DESIGNS

The following presents the eight designs on a conceptual level and describes how they are intended to support self-reflection and emotion regulation. For brevity, the multi-stage process of producing

and selecting the designs for this study is only briefly reported in what follows. The full descriptions of the designs, as they were shown to the survey participants, can be found in Appendix 2.

3.1 The Process of Producing and Selecting the Designs for the Study

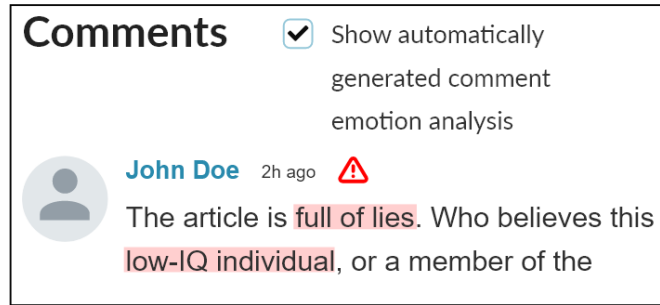
The design work for this study builds upon our earlier research-through-design exploration [37], in which we envisioned unconventional solutions to the problem of uncivil commenting with a critical voice. In the study, we unpacked this same problem area and outlined critical perspectives on potential solutions by describing and analyzing four designs that aimed to support emotion regulation by facilitating self-reflection. Next, to explain how the designs utilized in this study were created, we briefly recap the design process of the earlier study [37].

First, to create novel designs, we identified existing design conventions by analyzing social media platforms and news websites. Specifically, we examined the commenting systems in the 15 most popular—by traffic—news websites in the U.S. in 2021. Further, as the research took place in a Finnish university, we examined them in four most popular Finnish news websites (tabloids *Ilta-Sanomat* and *Iltaalehti*, national newspaper *Helsingin Sanomat*, and Finland’s national broadcaster *Yle*). This resulted in lists of existing UI conventions (e.g., an option to sort comments by recency) and cultural conventions (e.g., people are rarely specific about their intended audience). The lists were used in three ways: to find a convention to be tweaked slightly, to avoid reinventing existing solutions, and to reflect on what kind of solutions might fit various news websites.

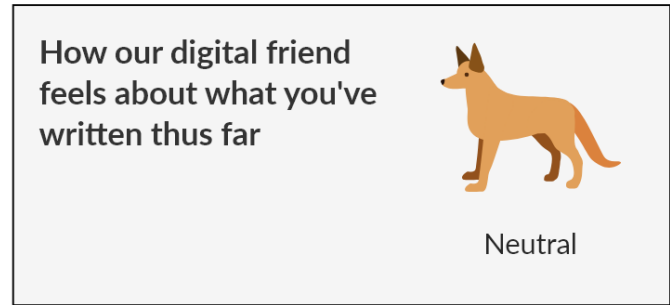
Second, approximately 60 concept ideas were sketched based on several idea generation sessions. The idea generation was conducted by a design team consisting of the first author, who has a formal education in interaction design and industrial design, and two colleagues, who both have formal educations in user experience design and software engineering. While the idea generation was not guided by specific design creativity methods, such as fictional inquiry or brainstorming methods, two general strategies mentioned in the critical design literature were used: (1) the designer picks a literary device (e.g., irony, sarcasm, parody, or ambiguity) and attempts to implement it in designs [35] and (2) the designer picks a convention (cultural or UI) and tweaks it slightly, for example, by introducing a foreign concept, and then reflects on the result [2].

Third, 19 of the sketched ideas were subjectively evaluated by the design team as more promising in terms of perceived criticality, novelty, feasibility, and effectiveness. Following this, the first author created UI mock-ups of the 19 ideas. Also, four of the 19 mock-ups were pictured and analyzed in depth in the earlier study [37]. Then, in the present study, we further developed eight of the ideas and made them more presentable. To help ensure that the evaluated designs represent a rich breadth of approaches to support self-reflection and emotion regulation in online discussion, we categorized them by the timing of the intervention and by the design strategy for emotion regulation (more on this in the next section). In addition, we subjectively assessed the designs as conceptually different from one another.

Highlight



Creature



Symbols



Evaluate

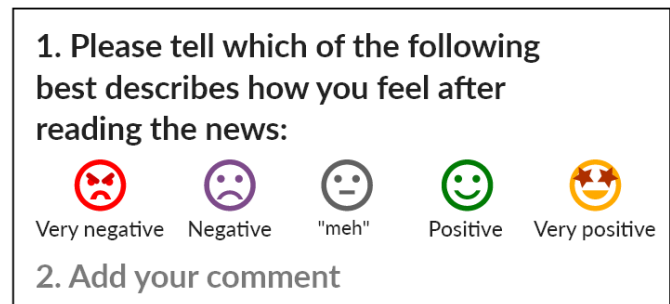


Figure 1: Highlight, Creature, Symbols, and Evaluate designs in short.

3.2 The Designs in Brief

We first briefly describe main functionality of and the theory behind each design proposal, followed by an analysis and comparison of the emotion regulation strategies they manifest. Lastly, we briefly describe the basic motives present in the designs.

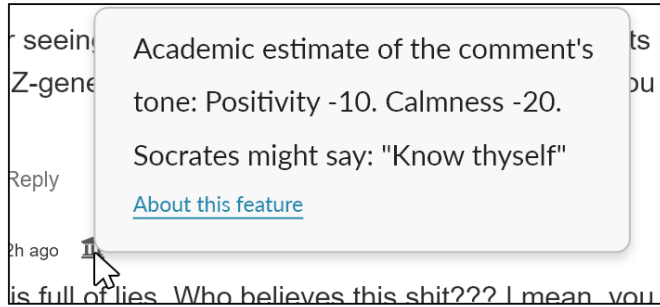
In the *Highlight* design (see Figure 1 top left), the user is offered an option to view an analysis of the emotions in comments. If the user checks a checkbox, negative emotional expressions are highlighted in red. Comments containing strong negative expressions are also marked with an alert symbol. The design is inspired by the theory of affect labeling [63], and speculates that highlighting negative emotional expressions in comments could calm the users. That said, while the idea of highlighting is straightforward, it is uncommon to show this type of analysis to users. We have not seen this in use on any website.

In the *Creature* design (see Figure 1 top right), an animated dog reacts to the emotional tone of a comment, as the user writes the comment. The design attempts to encourage change through an emotional attachment to a virtual pet dog. The benefits of using emotional attachment to pets to motivate behavior change have been documented in previous research (e.g., [16, 40]). In the design, the pet dog is displayed below the text-area, and it is described as “our digital friend.” If the user writes in a positive way, the dog appears happy, as if ready to play. If the user is writing in a neutral way, the dog appears neutral (see Figure 1 top right). If the user is writing in a negative way, the dog sits on the floor; keeps its head and ears down, with its tail between its legs; and faces away. We argue that the use of an animated dog for this purpose is a novel idea.

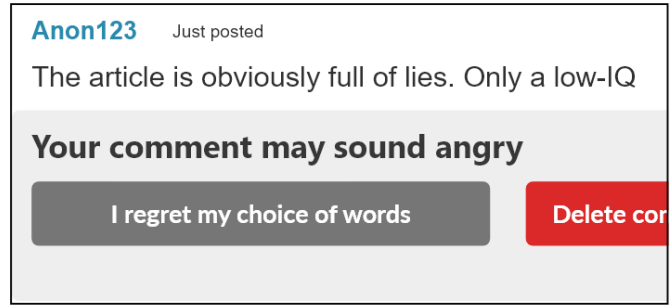
In the *Symbols* design (see Figure 1 bottom left), the user is offered a way to provide anonymous, private feedback to any of the previous commenters. This is intended to decrease the likelihood of written personal attacks toward other commenters. It has been demonstrated that uncivil comments (including replies) promote further incivility [11, 74], and that ad hominem attacks are a frequent type of incivility online [13, 41]. In the design there are buttons depicting a bomb, a gavel, a smiling face, and a heart next to every comment. The bomb symbolizes “Full of arrogance”; the gavel “False claim/s”; the smiling face “Well said”; and the heart “Love it!” Also, every user’s profile contains a prominent section entitled “Overview of the feedback from other users”, which displays the same symbols and the number of times the user has received these feedback types. The concept relates to comment up-voting tools seen on popular social media sites and commenting platforms. It is thus arguably less novel than, e.g., *Creature*.

In the *Evaluate* design (see Figure 1 bottom right), the user must first indicate how they feel before they can add their comment. This is done by clicking a smiley face that represents their emotional state. It is proposed that naming the emotion could have a calming effect on an angry user. The design is inspired by and applies the theory of affect labeling [63]. The proposed functionality is relatively like existing feedback tools (e.g., Facebook reactions), making the design appear as the least original of the eight designs. That said, unlike the other designs, Evaluate and Symbols do not propose that the website publicly evaluates comments for their quality. Hence, these designs are also included in the study out of interest for finding whether the difference in the evaluating party is a highly significant factor in acceptability.

Philosophy



Regret



Warning



Audience

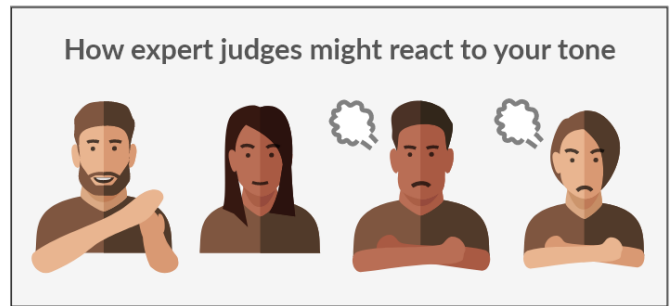


Figure 2: Philosophy, Regret, Warning, and Audience designs in short.

In the *Philosophy* design (see Figure 2 top left), problematic comments and comment threads are marked with a university icon. If the user presses the icon, a box with the emotion score for the comment or comment thread and a quote from Socrates, “Know thyself!” [72] is revealed. The emotion score has two dimensions, positivity, and calmness. The design proposes that automatic evaluation of comments should be done but in a relatively subtle, inconclusive, and ambiguous way. We argue that the use of the icon, the quote, and this type of analysis together are novel and uncommon.

In the *Regret* design (see Figure 2 top right), users’ comments are automatically evaluated directly after posting. If a comment sounds very angry, the user is notified and offered various follow-up actions below the published comment and by email. The first offered follow-up action is to regret the choice of words, the second is to delete the comment, and the third is to edit it. If the user chooses the regret option, a notification is attached to the comment, stating “username regretted their angry words”. While moderators often ask users to edit or delete their angry comments on social media sites (e.g., in Facebook groups), we argue that this emphasis on regret in online news commenting is novel. Previous research has found that postings with profanity or obscenity can be a cause of regret for Facebook users [66].

In the *Warning* design (see Figure 2 bottom left), a notification is shown above the comment section, indicating a description of the argumentation within the comment section (e.g., “10% Hatefulness”). The design proposes that labeling the emotional content of the comment section could help the user to deal with overly negative comments and decrease the likelihood of the user leaving an unconstructive comment. Also, it is proposed the design would

help news readers to decide if they want to read the comments. The concept is somewhat like what has been done in Yahoo News, as discussed above, and not as novel as some of the other designs.

In the *Audience* design (see Figure 2 bottom right), when a user is writing their comment, a virtual audience of expert judges reacts to its tone in real time and their reaction is displayed below the text area. The design intends to evoke the sense of having a live audience, which can make one consider their self-presentation through writing. Related to this intention, previous research has found that showing Facebook users profile pictures of people who will see (cf., judge) their posts can help some of them avoid regrettable disclosures [67]. Also, the *Audience* design utilizes the concept of being watched to induce self-awareness (e.g., [6, 10]). Previous research implies that designs that induce self-awareness might reduce abusive comments to news [55]. The *Audience* would function as follows: If the user writes in a moderately positive way, some members of the audience appear glad, and others have a neutral expression. If the user writes in a rather negative way, most members of the audience appear angry or frustrated. The audience’s appearance in the proposal is also intended to communicate that the audience is ethnically diverse. We argue that the proposal to use virtual audience in the context is, again, a novel one.

Next, we explain how we adopted Yoon et al.’s [73] framework that they created for designers to help them develop solutions that support users to better deal with their emotions. The framework contains 17 “emotion strategies”, which they propose might work in human-product interactions. We used five of the strategies, which we subjectively judged most applicable in this context, to help us select the eight designs to study. The strategy of avoidance relates

Table 1: Selected approaches to self-reflection and emotion regulation [73] adapted to this design context

Timing	Designs	Emotion regulation strategy
Before reading	Philosophy, Warning	Avoidance, Raising self-awareness
While reading	Highlight, Symbols	Problem-focused coping, Raising self-awareness
Before writing	Evaluate	Raising self-awareness
While writing	Audience, Creature	Suppressing expressions, Raising self-awareness
After writing	Regret	Reappraising events, Raising self-awareness

to “things one deliberately does before she/he experiences certain emotions as well as associated behavioral and expressive responses” [73]. *Philosophy* and *Warning* relate to the strategy because they intend to help the reader to avoid the negative emotions comments may cause. The strategy of problem-focused coping refers to finding “practical ways to deal with stressful situations” [73]. *Highlight* and *Symbols* intend to provide a way for the reader to investigate or deal with overly negative comments. It is hoped that these designs will reduce the chance that the reader will respond very negatively. Next, while the strategy of raising self-awareness can be said to be utilized in all the designs because they all have consequences for the comment writer and may induce the feeling of being observed, the strategy is at the forefront in *Evaluate*. *Evaluate* directly asks the user how they feel. Next, *Audience* and *Creature* relate to the strategy of suppressing expression because these designs intend to notify the writer that they are writing in an overly negative tone, enabling them to adjust their tone. Finally, *Regret* relates to the strategy of reappraising events because it intends to change how the writer and then, potentially, the reader perceive the situation.

Lastly, the design proposals may be read as critical or speculative [1, 2]. They are removed from commercial constraints, and they are intended to present new perspectives and encourage user reflectiveness.

4 METHODS

We ran an international online survey to collect a diverse sample of design evaluations by people who comment online news on news sites. The study was implemented with LimeSurvey and invitation to it was circulated at Prolific, a platform for online subject recruitment [47].

4.1 Participants and Recruitment

To select a diverse sample of participants, we first conducted a pre-survey regarding how often the candidate respondents read and commented on online news articles. It involved 2,000 participants who met the specified eligibility criteria: fluency in English, normal or corrected-to-normal vision, and a minimum approval rate of 70% in Prolific (percentage of total submitted studies minus returned).

The criteria for recruiting the pre-survey participants into the design survey were that the participant had provided complete answers and commented at least occasionally on online news sites (excluding social media sites and blogs). Altogether, 480 participants were recruited based on their commenting activity. Of the 480 survey responses, 41 were discarded as incomplete (i.e., missing answers), duplicates (i.e., the same person completing the survey twice), or click-throughs (i.e., two standard deviations faster

Table 2: Participants’ background information

Accepted responses	N = 439	%
Current residence		
UK	190	43.3
Poland	53	12.1
US	44	10
Portugal	39	8.9
Other countries	< 20 per country	23
Unspecified	12	2.7
Secondary education (e.g., GED / GCSE)	22	5
High School diploma / A-levels	69	15.7
Technical / community college	45	10.3
Undergraduate degree (BA / BSc / other)	166	37.8
Graduate degree (MA / MSc / MPhil / other)	127	28.9
Doctorate degree (PhD / other)	8	1.8
Did not know / not applicable	2	.5
Female	199	45.3
Male	240	54.7
Participants’ ages ranged from 18 to 75 years (average 33.5 years, SD = 11.98)		

than the average response time or nonsensical answers to open questions). Separate attention check questions were not used as meaningful answers to the open questions regarding the designs were thought to indicate commitment and attentiveness. For an overview of participants with accepted responses, see Table 2.

Lastly, we note respondents’ opinions of comment moderation were somewhat skewed in favor of greater moderation. In answering the question “The news site should moderate the discussion more than currently”, 3% of the respondents strongly disagreed, 9.6% disagreed, 9.8% somewhat disagreed, 19.6% neither agreed nor disagreed, 20.5% somewhat agreed, 24.6% agreed, and 13% strongly agreed.

4.2 Survey Procedure and Questions

Each participant was shown two pseudo-randomly selected designs. The presentation order of the two designs was randomized. The survey questions included various closed-ended statements and

open-ended questions so as to allow the researcher to holistically study the respondents' impressions and expectations. The questions on design evaluation included statements on various inherent design qualities, desirability, and the expected effects on emotion regulation and behavior. The same set of questions was presented for both designs, though in different, random order. The participants were asked to name their most frequently used news site and consider the presented designs in light of what the commenting is like in that particular context. In terms of background and contextual questions, the participants were asked about socio-economic factors and preferences regarding moderation strength, as well as to assess the commenting culture on the online news site that the respondent primarily uses. The full survey is provided in Appendix 1.

The questions on design evaluation were operationalized by us, except for three items we adopted from Hassenzahl et al. [32] (conventional–inventive, unimaginative–creative, and cautious–bold) and numerical version of the visual Self-Assessment Manikin – scale [7]. Researchers who ask participants to evaluate novel designs in an online survey must often invent new measures and/or pick and utilize parts of existing sets of measures [18, 33]. The same approach was justified in this study by the novel elements of the designs and the lack of suitable pre-existing sets of measures. In addition, we operationalized in Likert-scale items five design dimensions that may capture experienced “dissonance”: clarity, reality (similar to feasibility), familiarity, veracity (e.g., sarcasm or spoof in design), and desirability [61]. The background questions studied in this paper were also operationalized by us. Earlier research on commenting and comment moderation has also typically created new measures [15, 56, 57, 71].

4.3 Data Analysis

For statistical analyses, IBM SPSS Statistics2 Version 26 was used. To increase the validity of design comparisons, the dimensions in the data were first extracted using exploratory factor analysis (EFA). As stated by DiStefano et al. [17], “following an exploratory factor analysis, factor scores may be computed and used in subsequent analyses.” Principal axis analysis with oblique rotation (Promax) was conducted to identify and create sets of variables that explain the maximum amount of variability in the data (Tables 3 and 4). Notably, the EFA was based on 7-point scale items operationalized by us. Designs' emotional impact scores are not reported due to paper length limitations. Further, the EFA was based on the statements about the latter design the respondent saw because we assumed that the questions would be easier to answer when being answered for the second time. Also, all the factor loadings exceed 0.400 and are thus considered sufficient [23]. Then, sum variables (factor-based scores) were created based on found factors for use in subsequent analysis by averaging the individual variables in the factors.

Kruskal-Wallis tests were used to compare the ratings of the various designs (based on the factor-based scores). Significant effects (at $\alpha = .05$) were followed with pairwise comparisons, with Bonferroni correction being used to correct for the family-wise Type-I error rate.

To investigate background variables' effects on design ratings, we conducted univariate linear regression analyses. Separate analyses were conducted for each predictor–outcome variable pair due to multicollinearity between the background variables [44]. The predictors included the background variables extracted using EFA, and the outcome variables were the identified instrumental quality and inappropriateness constructs (see Section 5.1).

To gain insight into the reasoning behind the numerical ratings, we conducted thematic analysis [8] of the respondents' first reactions on the designs. Most of the analysis work was conducted by the first author, who was primarily responsible for creating the designs and thus most capable of understanding what the respondents referred to in their comments on the designs. The other authors offered additional viewpoints to the interpretations. The reactions were captured by an open-ended question, “How would you describe your immediate reaction to this solution? How do you feel about it?” The thematic analysis of the answers focused on explicit comments on design features and mechanisms that could help illuminate the design ratings. Therefore, quantifying the answers and reporting exact counts was not seen as reasonable. The analysis was conducted using MS Word. The respondent quotes are verbatim, except for corrected typos.

5 FINDINGS

5.1 Relevant Sum Variables Identified Using Explorative Factor Analysis

5.1.1 Design Quality Variables. The responses loaded into two key factors (Table 3). We interpret Factor 1 as indicating the perceived **instrumental quality** of the solution (i.e., the degree to which it is perceived to serve as a crucial tool). Factor 2 relates to negative impressions and risks and could be interpreted as referring to the perceived **inappropriateness** of the solution (i.e., the degree to which it is perceived as unsuitable or wrong in the context). The factors appear demarcated by valence (positive vs. negative). The included items, all on 7-point Likert-type scale, were averaged to create sum variables (factor-based scores) and thus represent the two factors in subsequent analyses.

5.1.2 Background Variables. The factor analysis identifies four relevant factors (Table 4). We interpret Factor 1 (Table 4) as reflecting the respondent's view of how desirable the commenting is on a given news site (we name this factor **view on the situation**). Factor 2 relates to behavioral tendencies regarding how likely a person is to engage in discussion, some of which may be heated or controversial (i.e., **interest in debate**). Factor 3 reflects emotional reactions in terms of the degree to which the person is not tolerant of uncivil commenting (i.e., **toleration of incivility**). Factor 4 concerns the user's attitude toward how comments should be moderated (i.e., **wish for moderation**). Because the factors seem meaningful in the given context, the negatively loading items in each factor were reversed, and the items of each factor were averaged to create sum variables (linear combination ignoring weights), or factor-based scores, to represent each factor and be used in subsequent analyses.

Table 3: Exploratory factor analysis of the design quality variables

	Factor	
	1	2
If this solution was implemented, I would take part in news commenting more actively	.882	
This solution would likely engage me in more active discussion on news articles	.870	
The solution would help me manage my emotional reactions	.832	
The solution would help me express my opinions more freely	.804	
The solution would have a calming effect on me	.766	
The solution matches what kind of solutions I wish for	.741	
Overall, I find the solution desirable	.690	
I feel that the designer who made this is trying to deceive or ridicule me		.760
The solution would violate my freedom of speech too much to be acceptable		.727
If I was angry, the solution would make me even angrier		.696
I feel that the solution is sarcastic or a spoof		.691
The risks that the solution introduces are higher than its benefits		.624

Note: Rotated factor solution (Promax with Kaiser Normalization). KMO = 0.908; Bartlett: $\chi^2 = 3522.2$; $df = 66$; $p < .001$. Coefficients < 0.3 suppressed. (N = 439; cut-off of eigenvalue ≥ 1 ; total variance explained: 59.74%; variance explained by Factor 1: 49.97%). Cronbach's alpha: Factor 1. 0.93; 2. 0.82.

Table 4: Exploratory factor analysis of background statements concerning one's behavior, attitudes, and assessment of the commenting culture on a selected news site

	Factor			
	1	2	3	4
Inappropriate comments get quickly removed or are not published at all	.763			
The comments on news articles are respectful	.752			
The news site has moderation practices that ensure the quality of commenting	.744			
The comments on the news site are generally of high quality	.725			
Overall, the news site feels like a place where uncivil commenting simply does not belong	.703			
The news site does not encourage civilized commenting	-.581			
The comments on news articles include inappropriate language	-.495			
Trolling and other intentional misbehavior is common in the commenting section	-.494			
I tend to comment on news articles on topics that are controversial		.686		
I tend to participate in the discussion only when the discussion is heated		.682		
When reading others' inappropriate comments, I tend to write inappropriate responses		.603		
I tend to reply to others' comments		.594		
If I see inappropriate comments on the news site, it will bother me			.890	
If I see hateful speech in the comments, I will not be bothered			-.580	
If I see disrespectful comments on the news site, I will get anxious			.539	
Publishing inappropriate comments is a problem that should be taken more seriously on this news site				.848
The news site should moderate the discussion more than currently				.743

Note: Rotated factor solution (Promax with Kaiser Normalization). KMO = 0.818; Bartlett: $\chi^2 = 2664.756$; $df = 136$; $p < .000$. Coefficients < 0.3 suppressed. (N = 439; cut-off of eigenvalue ≥ 1 ; variance explained: 49.67%). Cronbach's alpha: Factor 1. 0.86; 2. 0.73; 3. 0.70; 4. 0.81.

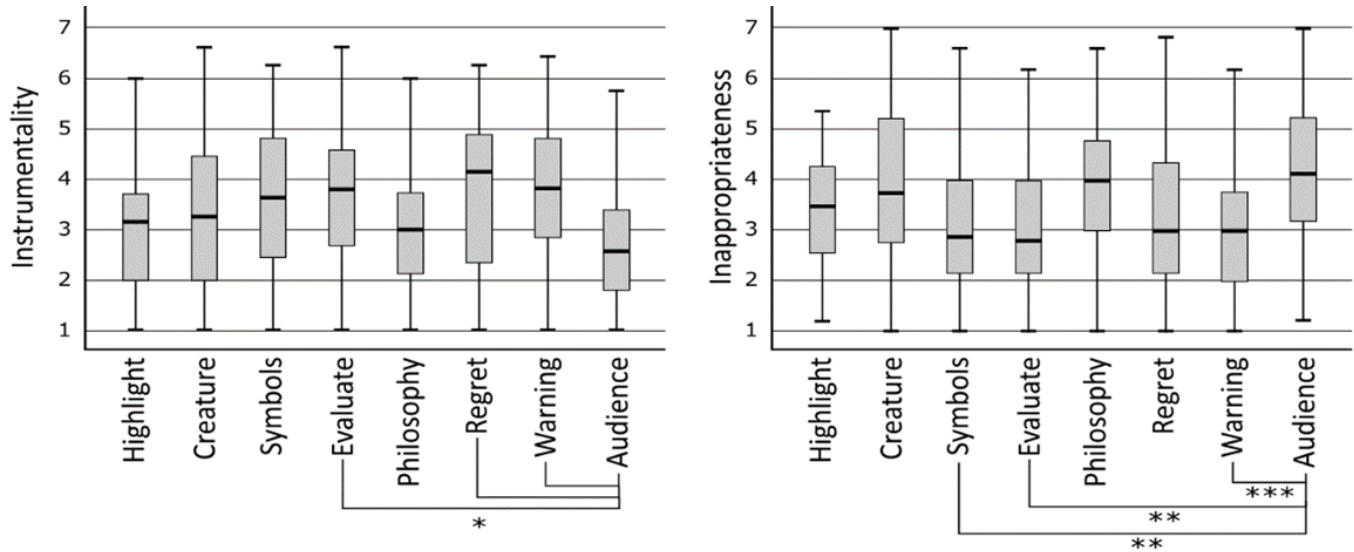


Figure 3: The instrumental quality and inappropriateness ratings of the eight designs (scale 1–7, 1: strongly disagree, 7: strongly agree). The asterisks indicate significant differences according to p-values adjusted with Bonferroni correction: * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 5: Results of regression analyses investigating associations between background variables and instrumental quality ratings

Background variable	Perceived instrumental quality			F (1, 438)	p
	R2	B (95% CI)			
Wish for moderation	.031	0.17 [0.08, 0.26]		13.8	<.001
Not tolerating incivility	.034	0.18 [0.09, 0.27]		15.3	<.001
View on the situation	.014	0.14 [0.03, 0.26]		6.4	.012
Interest in debate	.006	0.11 [-0.02, 0.25]		2.5	.115

Note: Instrumental quality ratings are on a 1–7 scale.

5.2 Design Quality Ratings

Figure 3 summarizes the design ratings for the **instrumental quality** and **inappropriateness** sum variables. Statistically significant differences between the designs were found for both variables (instrumental quality: Kruskal-Wallis $H(7) = 27.67$, $p < .001$; inappropriateness: $H(7) = 36.07$, $p < .001$). Further, post-hoc tests show significant differences in pair-wise comparisons (Fig. 3). Especially *Audience* was considered low in instrumental quality and high in inappropriateness, when compared to other designs. While the ratings do not imply any generally preferred design approach, *Regret* received the highest instrumental quality score, and *Evaluate*, *Symbols* and *Warning* received the lowest inappropriateness scores.

5.3 Associations between Background Variables and Design Ratings

Most of the identified background variable factors were found to significantly predict the instrumental quality rating (see Table 5). Only the variable of interest in engaging in debate was not statistically associated with instrumental quality. However, the background

variables were not found to significantly predict the perceived inappropriateness of the designs (p -values $> .069$; hence excluded from Table 5).

5.4 Respondents’ Reactions to the Design Features

To gain insight into the design ratings, we qualitatively analyzed the respondents’ first reactions on the designs. The analysis focused on explicit comments on the design’ features and mechanisms.

5.4.1 Philosophy and Warning. We proposed above that *Philosophy* and *Warning* would enable users to avoid reading uncivil comments. Considering *Philosophy*, some respondents noted that marking problematic comments with an icon could not only highlight comments for users to avoid but also comments to attack. A few respondents also expected some users to try to get the icon. Considering *Warning*, while many respondents liked the proposal as it would help them avoid reading negative comments, many also doubted the warning would be useful to users. For example: “People who tend to peruse the comments already know those figures, and those who won’t indulge in that, wouldn’t care about them.”

5.4.2 Highlight and Symbols. We proposed that *Highlight* and *Symbols* offer ways for the user to cope with negative comments. Considering *Highlight*, the respondents who saw it as useful thought the highlighting of negative words would help to avoid some comments altogether. No respondent commented that drawing more attention to the negative words could be helpful. Considering *Symbols*, many respondents seemed to believe the design would help to do something about an annoying comment while avoiding direct conflict. For example: “This is pretty intelligent way of expressing your opinion rather than getting personal and start attacking.” However, *Symbols* had another feature which was widely disliked: many respondents noted that enabling other users to leave a lasting, negative mark anonymously on another user’s profile for all users to see would be a bad idea.

5.4.3 Evaluate. While all the designs could raise the user’s self-awareness, *Evaluate* relies on it. However, the respondents were puzzled by the design. Only a few respondents commented that it would be helpful to the commenter to identify their emotion, for example: “it would help people reflect about how they are feeling which could moderate behaviors.” Many respondents speculated that other commenters or moderators could benefit from knowing how the commenter felt. Further, a few respondents commented that it would be annoying to indicate the emotion every time one comments, and a few commented that the emojis are not suitable for a news site.

5.4.4 Audience and Creature. We proposed above that *Audience* and *Creature* would provide the comment writer with the opportunity to adjust their tone. Considering *Audience*, several respondents were explicit that giving the commenter feedback on their writing using the virtual audience of experts would make the commenter feel overly anxious or annoyed. For example: “I don’t want to instantly know that I’m being judged before the comment is even posted” and “I’d be concerned that it would encourage me to write comments that make the virtual experts happy rather than helping me concentrate on what I’m thinking about the news issue.” Further, some respondents noted that “[the feedback] may only serve to encourage some people to carry on their comment further [into negativity].” That said, some commented they would find the feedback useful when composing. Considering *Creature*, while many commented the use of animated dog is childish, many also commented that it is clever as many people feel empathy with dogs. Further, while *Creature* would provide instant feedback like *Audience*, much fewer respondents commented it would make the writer feel anxious.

5.4.5 Regret. We proposed above that by enabling the comment writer to show regret, the design would change how the writer and then, potentially, the reader perceive the situation. Some respondents saw value in the option to add a label that one regretted their choice of words, for example: “I feel like it would be a good way to redeem the person who sends his angry thoughts as an impulse reaction upon reading an article, but then gets the chance to show other people than although he stands by his opinion, he admits that he could have worded it better.” However, most respondents thought using the option would lead to the user being disrespected by others, for example: “It feels rather sanctimonious. People don’t

like admitting they were wrong and it could cause other users to disrespect them.” At the same time, notifying the user after posting and providing the edit and delete options were perceived as fine by many respondents.

6 DISCUSSION

6.1 Reflection on the Findings

We first reflect on how the proposed designs differ from one another in terms of perceived user-centric quality. The findings showed that *Evaluate*, *Regret*, and *Warning* were rated significantly higher than *Audience* in terms of instrumental quality. Also, *Symbols*, *Evaluate* and *Warning* were rated significantly lower than *Audience* in terms of inappropriateness. The user reactions to the designs, as manifested by the scores, would likely affect a test of their actual effect (i.e., emotion regulation). The instrumental quality factor features measures related to positive valence and low arousal, while the inappropriateness factor features the opposite. Thus, for example, based on the scores, the *Audience* design is more likely to anger the user (high arousal, low valence) than *Warning*. That said, none of the design alternatives received particularly high ratings on average: on average, the designs were seen as neither particularly high in instrumental quality nor completely appropriate. At the same time, the variance in respondents’ evaluations is relatively high, which suggests that the participants’ preferences and/or viewpoints varied strongly.

Following this, we studied which background factors predicted the design ratings. While we found no associations between the background variables and inappropriateness ratings, several of the background variables predicted perceived instrumental quality. The results indicate that a decrease in toleration of incivility predicts increased perceived instrumental quality. In the same vein, an increase in instrumental quality was found to be predicted by desire for comment moderation and a decrease in view of how dire the situation is on the news site. Future research could elaborate on these differences. We speculate that a desire for moderation predicts a slight increase in all the ratings because those who wish for more moderation tend to agree with the stated goal of the designs to “help improve discussion around online news articles or help to keep it good”.

We also studied how respondents’ comments on the design features and mechanisms could illuminate the results. We discuss the findings on *Audience*, *Creature*, *Evaluate* and *Regret*, as we consider the responses to these the most illuminating in terms of reasons behind the relatively low ratings. Comparing respondents’ comments on *Audience* and *Creature* suggests that *Audience*’s low instrumental quality and high inappropriateness ratings are largely explained by the form and appearance of the feedback. The respondents did not appear to find the idea of receiving instantaneous feedback on their tone of writing disturbing in itself. This finding aligns with a recent study suggesting that providing users real-time feedback about the quality and language of their contribution in an online news commenting system is appreciated by users [4]. That said, also the novelty of the *Audience* and *Creature* designs may have contributed to their ratings, as people tend to prefer the environment to stay as it already is (i.e., status quo bias) [52].

Evaluate's mid-range instrumental quality ratings could be partially explained by the fact that most respondents were unaware that giving a label to one's emotion has a regulatory effect. This aligns with previous findings that people are mostly unaware of the regulatory effects of affect labeling [63]. That said, the appropriateness score implies that most users do not consider it inappropriate to ask a commenter to tell how they are feeling. Therefore, the design concept warrants further study and could probably be tested on a news site without major loss of users.

Regret's mid-range ratings could be explained by the fact that many respondents believed that using the regret option (to add a label that one regretted their choice of words) would lead to the user being disrespected by others. At the same time, the other features relating to the user regretting their post (the edit and delete option) were perceived more favorably; and a few respondents saw value also in the regret option. This might not be surprising as a significant portion of social media users have posted something they regret [21, 66]. Therefore, further study on possible ways to get some users to edit, remove, or otherwise show regret over their choice of words is warranted.

6.2 Reflection on the Research Process and Methodology

Considering the reliability of the findings, the explorative nature of the study and lack of well-established measurements creates challenges in terms of the reliability of the measurements and, hence, the validity of the statistical associations. In particular, the identified design quality factors are much simpler and fewer in number than we anticipated while operationalizing the various measures. This implies that it was difficult for the respondents to evaluate the proposed solutions. Further, considering the methodological approach in general, we acknowledge that the use of Prolific in recruiting participants for the survey resulted in the over-representation of participants from the UK and other western countries.

Despite these shortcomings, we argue that the methodological choices were justifiable vis-à-vis the set goals for the following reasons. First, the online survey enabled us to reach a large number and spectrum of people who actively comment on online news sites, offering an extensive overall picture of the potential end-users' views. The diverse sample and large number of respondents allowed us to recognize the variance in user perceptions more clearly than with an interview study, for example. Second, the self-operationalized measures managed to inquire about qualities and perspectives that go beyond conventional usability or task load measurements. For example, we obtained a deeper understanding of designs with respect to the potential of the solution in managing emotional reactions. Based on the findings, we will particularly consider studying in more detail designs like Regret, where the user is notified sometime after they have finished writing their comment. Also, we were able to form meaningful factors and factor-based sum variables based on the measures. Third, the qualitative analysis of respondents' reactions to the designs shed light on the ratings.

7 CONCLUSION

This paper provides a user-centric evaluation of eight unconventional design proposals that, through various mechanisms, aim to

support emotion-related self-reflection and emotion regulation in commenting on online news. The paper reports the findings of an online survey, analyzing differences in respondents' preferences across the designs, the respondents' comments on the designs, and the background factors that were associated with the evaluations. The key findings highlight that, while the preferences vary significantly, the participants rated four designs higher than a design where a virtual audience of experts would judge the tone of the writing. The analysis also shows that the perceived instrumental quality of the designs is associated with three background variables. For example, an increased desire for comment moderation was found to predict increased perceived instrumental quality.

All in all, the study advances our understanding of what kind of UI solutions, from the end-user's perspective, may be desirable in terms of improving the quality of online news commenting. We argue that this exploratory study is an important step toward the development of acceptable UI solutions that could effectively mitigate the issue of uncivil behavior in online news commenting. We expect the novel designs, the self-operationalized measures, and the findings to inspire new designs and studies on the role of UI design in mitigating online incivility.

ACKNOWLEDGMENTS

We thank all the participants in the survey study. The research was funded by the Academy of Finland (grants 320767, 320766).

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A APPENDICES

A.1 Full Surveys

The following lists the survey questions following the survey structure.

–Pre-survey–

Title: Survey on commenting online news

Thank you for your interest in this research! This is a pre-survey that is used for selecting the participants for an actual research survey.

The purpose of the study. We are interested in how often you read and/or comment news articles on online news sites and social media. It does not matter which devices you are using (desktop computer, laptop, mobile device, etc.). Also, any professionally produced news content counts (by commercial media corporations, public broadcasting organizations, national news sites, etc.).

Your participation in the study is fully voluntary. You may stop the survey at any moment by closing the page, in which case the survey tool will not send any of your answers.

Confidentiality, data processing and retention. All the data will be anonymized and used only for research purposes as required by the European Union's General Data Protection Regulation (GDPR).

After the study has ended, the data will be stored and managed carefully according to national recommendations on research integrity. This survey should only take a minute or so to fill.

Responsible researchers: anonymized.

By checking this box, I confirm I have read the study description and consent to participate in this study: Y or N

Please enter your Prolific ID if it has not been entered automatically

Please consider your use of online news sites

I read news articles on online news sites Several times a day, Daily, Weekly, Monthly, Yearly, Less than once a year, Never

I read at least some of the comments to news articles on online news sites Several times a day, Daily, Weekly, Monthly, Yearly, Less than once a year, Never

I comment on news articles on online news sites – Several times a day, Daily, Weekly, Monthly, Yearly, Less than once a year, Never

Please list your 1 to 3 most frequently visited news sites where you typically also read comments or add your own comments

Please consider your use of social media services, such as Facebook or Twitter

I post and comment news articles on social media services, such as Facebook or Twitter Several times a day, Daily, Weekly, Monthly, Yearly, Less than once a year, Never

I comment on others' posts about news articles on social media Several times a day, Daily, Weekly, Monthly, Yearly, Less than once a year, Never

I am interested in participating in a follow-up study: Y or N

DESIGN SURVEY

Title: Survey on improving discussion around online news articles

Thank you for your interest in this research!

The purpose of the study. This survey will ask about your behavior and attitudes related to commenting news on online news sites. You will be shown two speculative prototypes that might help improve discussion around online news articles or help to keep it good and we will ask what you think about them. Please answer honestly and truthfully to all the questions, rather than in a way that you think we would like to hear.

Your participation in the study is fully voluntary. You may stop the survey at any moment by closing the page, in which case the survey tool may send some or all the answers you have given until that moment but as a general rule, you will not be compensated. However, under certain circumstances we may still choose to pay partial compensation.

Confidentiality, data processing and retention. All the data will be anonymized and used only for research purposes as required by the European Union's General Data Protection Regulation (GDPR). Your answers to open questions may be reproduced in whole or in part for use in presentations or written results of this study. However, your level of education, age, or any other identifier will never be revealed outside of the research team. After the study has ended, the data will be stored and managed carefully according to national recommendations on research integrity.

This survey asks for your consent to participate as well as some background information. This survey should take about 20 minutes to fill.

Responsible researchers: anonymized

By checking this box I confirm I have read the study description and consent to participate in this study: Y or N

Please enter your Prolific ID if it has not been entered automatically

Basic background questions

Age: dropdown menu 18 to 99

Gender: male, female, other, prefer not to say

Level of education: Secondary education (e.g. GED or GCSE) (1), High School diploma A levels (2), Technical or community college (3), Undergraduate degree (BA or BSc or other) (4), Graduate degree (MA or MSc or MPhil or other) (5), Doctorate degree (PhD or other) (6), Don't know / not applicable (0)

Current country of residence

On commenting history

Q: Considering my history of commenting on various news sites, I believe that I have written altogether: More than 10,000 comments, More than 1000 comments, More than 100 comments, More than 10 comments, Less than 10 comments

Please note that you cannot return to the previous page of the survey. Returning may prevent you from finishing the survey or you may even lose your answers. This means that you cannot change your answers after you have clicked "Next." If you accidentally press back in your browser, the browser may ask you to re-submit data or page. If this happens, follow the browser's instructions.

About your views on commenting

In the following questions, please consider your experiences of the discussion on the news site where you are most actively reading and posting comments (using any device). Spend a moment to choose the one that you are most active on.

Now, spend a moment thinking about a typical comment section on a news article and how it feels to read the comments and take part in the discussion. For example, think back recent articles or comments that you can remember particularly well.

Please name the news site that you are thinking about. Note that it must be identifiable, so please, for example, provide a link if the name can be misunderstood

Please select your level of agreement or disagreement with the following statements:

(Strongly disagree, Disagree, Somewhat disagree, Neither agree nor disagree, Somewhat agree, Agree, Strongly agree)

[What the variables below could measure: View on the situation]

The comments on news articles are generally of high quality

The comments on news articles are respectful

The comments on news articles include inappropriate language
Trolling and other intentional misbehavior is common in the commenting section

The people commenting on the news are mindful of others when expressing their opinions

[What the variables below could measure: Views the news site provides a stable commenting environment]

The news site does not encourage respectful commenting

Overall, the news site feels like a place where disrespectful commenting simply does not belong
The news site has moderation practices that ensure the quality of commenting

[What the variables below could measure: Toleration of incivility]

• If I see disrespectful comments on the news site, I will get anxious

• If I see inappropriate comments on the news site, it will bother me

• If I see hateful speech in the comments, I will not be bothered
[What the variables below could measure: Wish for more content moderation]

• Publishing inappropriate comments is a problem that should be taken more seriously on this news site

• The news site should moderate the discussion more than currently

• Inappropriate comments get quickly removed or are not published at all

Which of the following options for commenting would be the best on this news site? (Radio buttons)

• All news articles have a comment section

• Selected articles on specific topics have a comment section

• None of the news articles have a comment section

Now, please consider your commenting behavior in general

Consider your interests to write comments on various news sites. Please select your level of agreement or disagreement with the following statements:

(Strongly disagree, Disagree, Somewhat disagree, Neither agree nor disagree, Somewhat agree, Agree, Strongly agree)

[What the variables below could measure: Tends to be drawn in to comment by controversy]

• I tend to participate in the discussion only when the discussion is heated

• I tend to comment on news articles on topics that are controversial

• I typically comment on articles regardless of what the earlier discussion is like

[What the variables below could measure: Is an influencer of sorts]

• I am typically one of the first to comment on a new article

• My comments typically receive many likes or upvotes

• I tend to reply to others' comments

[What the variables below could measure: Acts on emotion in commenting]

• When reading others' inappropriate comments, I tend to write inappropriate responses

• When commenting, I tend to act based on my intuition and avoid overthinking my response

• I carefully think how others might interpret and feel about my comment

Motivations to read and write comments

Please consider what motivates you to read comments. Mark how often the different motivations are present when you read comments to news articles.

(Never, Rarely, Sometimes, Often, Always)

[Adapted from Springer et al.]

["Cognitive motive" items]

• I read comments to broaden my knowledge base

• I read comments to better understand others

["Social-integrative motive" items]

• I read comments to be part of the community

• I read comments to meet other users

[“Entertainment motive” items]

- I read comments because it is entertaining to see others fight
- I read comments for a pastime

Please consider what motivates you to write comments. Mark how often the different motivations are present when you comment on a news article. Again, focus on the news site that you are most familiar with.

[“Cognitive motive” items]

- I comment to understand events that are happening

- I comment to better understand others

[“User-journalistic interactivity” items]

• I comment to show disagreement with the article, parts of it, or the journalist’s opinion

- I comment to bring in my opinion

[“User-user interactivity” items]

- I comment to discuss with others

• I comment because I enjoy to see that others think the same way I do

[“Personal identity” items]

- I comment to establish my personal identity

- I comment to promote or publicize my expertise

Introduction to the Designs

Online news publishers have long sought means to improve the quality of comments on their news commenting sections. It has been argued that the discussion around news articles on news sites is too often disrespectful, uncivil, or otherwise impolite. Various solutions could be considered to solve these problems.

Next, we will show you two examples of different ways to possibly influence the commenting and reading behavior of the news site visitors. We want to understand how you experience them and what kind of opportunities or risks you see in them. Please, note that these are merely speculative prototypes created out of academic interests, rather than products that any news site would soon take into use.

(–The following block of questions were asked also for the second design shown to participant–)

The First Design / The Second Design and Questions About It

Please view this series of pictures of the design, and answer the questions below.

This design will later be referred to as: [short name, e.g., Highlight Emotions in Comments (see the list of short names at the end of this document)]

[Pictures of the design here]

- (Open question) How would you describe your immediate reaction to this solution? How do you feel about it?

On emotional impact

[Emotion dimension scales adapted from Bradley and Lang]

Please consider how the solution makes you feel.

The left end of the scale (-4) means that you feel completely unhappy, annoyed, unsatisfied, melancholic, despaired, or bored. The right end (+4) refers to the completely opposite feeling, feeling completely happy, pleased, satisfied, contented, or hopeful.

(Unpleasant -4, -3, -2, -1, 0, +1, +2, +3, +4 Pleasant)

The left end of the scale (-4) means that you feel completely relaxed, calm, sluggish, dull, sleepy, or unaroused. The right end (+4) refers to the completely opposite feeling, feeling completely stimulated, excited, frenzied, jittery, wide-awake, or aroused.

(Calm -4, -3, -2, -1, 0, +1, +2, +3, +4 Aroused)

The left end of the scale (-4) means that you feel completely controlled, influenced, cared-for, awed, submissive, or guided. The right end (+4) refers to the completely opposite feeling, feeling completely in control, influential, important, dominant, autonomous, or controlling.

(Controlled -4, -3, -2, -1, 0, +1, +2, +3, +4 In-control)

Based on your first impression, please select your level of agreement or disagreement with the following statements:

(Strongly disagree, Disagree, Somewhat disagree, Neither agree nor disagree, Somewhat agree, Agree, Strongly agree)

Discursive dissonance items (clarity, feasibility, familiarity, truthfulness, desirability). Inspired by Tharp and Tharp, 2019. Discursive Design

[What the variables below could measure: Clarity]

- I feel that it is clear what the solution aims at

- I feel that it is unclear how the solution would actually work

[What the variables below could measure: Feasibility]

• I feel that it is feasible for this to become a real, functioning solution

• I feel that this does not solve the problem of disrespectful commenting

[What the variables below could measure: Familiarity]

- The solution feels strange to me

- I have never seen such a solution before

[What the variables below could measure: Truthfulness]

• I feel the designer who made this is trying to deceive or ridicule me

- I feel that the solution is sarcastic or a spoof

[What the variables below could measure: Desirability]

- Overall, I find the solution desirable

• The solution matches what kind of solutions I wish for on design qualities

[Adapted from AttrakDiff]

Please compare the solution to your experiences of using news sites and their commenting features.

To me, the solution feels...

- (conventional 1, 2, 3, 4, 5 inventive)

- (unimaginative 1, 2, 3, 4, 5 creative)

- (cautious 1, 2, 3, 4, 5 bold)

On behavioral effects

[These questions were presented only with the following ‘reading-type’ designs: Symbols, Highlight, Philosophy, Warning]

Please consider how the presented solution might affect your own behavior in terms of reading comments on online news sites:

(Strongly disagree, Disagree, Somewhat disagree, Neither agree nor disagree, Somewhat agree, Agree, Strongly agree)

• If an earlier comment annoyed me, this solution would help me avoid writing an angry reply

• The solution would help me take an objective and neutral perspective to reading the comments

• The solution would help me to decide whether I want to read the comments

[The following questions were presented only with the following ‘writing-type’ designs: Audience, Creature, Evaluate, Regret]

Please consider how the presented solution might affect your own behavior in commenting news on online news sites:

- The solution would help me to write more respectful comments
 - The solution would affect how I phrase my comments
 - The solution would not influence my writing style
- [The following questions presented with all designs]
- Please consider how the presented solution might affect your behavioral tendencies and whether it would work in practice or not.
- [What the variables below could measure: Effect on emotion regulation in general]
- The solution would help me manage my emotional reactions
 - If I was angry, the solution would make me even angrier
 - The solution would have a calming effect on me
- [What the variables below could measure: Effect on commenting activity]
- If this solution was implemented, I would take part in news commenting more actively
 - I would likely comment less often on news if this solution was implemented
 - This solution would likely engage me in more active discussion on news articles
- [What the variables below could measure: Feasibility]
- The risks that the solution introduces are higher than its benefits
 - The solution would not work in the long-term
 - The solution would be accepted on the news sites I typically use
- [What the variables below could measure: Freedom of speech]
- The solution would violate my freedom of speech too much to be acceptable
 - The solution would help me express my opinions more freely

Misuse. If you expect that the solution would likely be misused, please tell how (free choice, text area)

(–End of the block of questions that were repeated for the second design–)

Questions on the Designs

Now, consider the two different solutions that you saw: XXX XXX (names in the end of this document). Which of them you found as the better solution for improving the commenting culture on online news?

[] XXX [] XXX

Why? If you are not sure why, please write “unsure.”

What were the strengths of the better design (e.g., effective in solving the problem, useful for self-reflection, easy to understand and use)?

What were the weaknesses of the worse design (e.g., unacceptable, too weird, hard to imagine them being used on the news sites that you know)?

*Explanation of the design naming scheme for the survey:

Reading/writing type (R/W), number, name in this paper, descriptive name shown to participants in the survey

R, 1, Highlight, Highlight Emotions in Comments

W, 2, Creature, Animated Creature

R, 3, Symbols, Feedback through Symbols

W, 4, Evaluate, Share feelings to comment

R, 5, Philosophy, Problematic Comments Get an Icon

W, 6, Regret, Option to Regret

R, 7, Warning, Warning About the Comments

W, 8, Audience, Virtual Audience of Experts

A.2 Designs as they were shown in the survey

You are reading the comments to an interesting but divisive news article. You are offered an option to view automatic analysis of emotions in the comments.

Comments

Show automatically generated comment emotion analysis



Matt 2h ago

I remember seeing these news in the 80s. The history repeats itself, again. The Z-generation shouldn't be scared, we've lived through worse.



John Doe 2h ago

The article is full of lies. Who believes this shit??? I mean, you have to be a low-IQ individual, or a member of the political party to believe it.



Jordan 2h ago

Hell no! I will drive till I die, and I sure as heck will travel by plane



Jenny 2h ago

Me too! I don't want to change my lifestyle because of this



Riley 2h ago

Now this is what I call journalism, great job!

Figure 4: Highlight part 1/2. The following freely available resources were used in making the designs: Semantic UI kit. Icons: Font Awesome, Ionic and Feather.

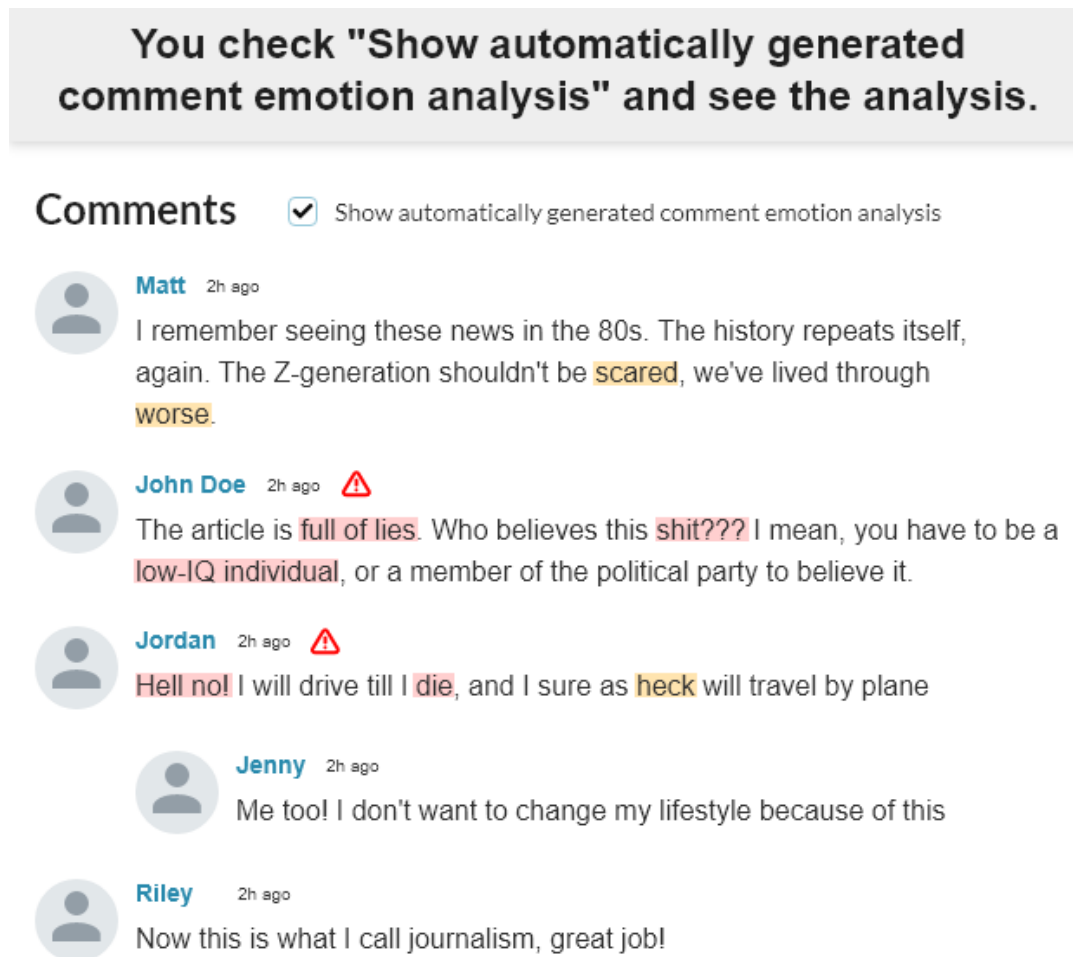


Figure 5: Highlight part 2/2. The following freely available resources were used in making the designs: Semantic UI kit. Icons: Font Awesome, Ionic and Feather.

You are reading the comments to an interesting but divisive news article. You are offered a way to give anonymous and private feedback to any of the previous commentators.

Comments


























-  **Matt** 2h ago
I remember seeing these news in the 80s. The history repeats itself, again. The Z-generation shouldn't be scared, we've lived through worse.
36 ^ v • Reply • Give private feedback:    
-  **John Doe** 2h ago
The article is full of lies. Who believes this shit??? I mean, you have to be a low-IQ individual, or a member of the political party to believe it.
36 ^ v • Reply • Give private feedback:    
-  **Jordan** 2h ago
Hell no! I will drive till I die, and I sure as heck will travel by plane
36 ^ v • Reply • Give private feedback:    
-  **Jenny** 2h ago
Me too! I don't want to change my lifestyle because of this
36 ^ v • Reply • Give private feedback:    
-  **Riley** 2h ago
Now this is what I call journalism, great job!
36 ^ v • Reply • Give private feedback:    

Figure 6: Symbols part 1/3. The following freely available resources were used in making the designs: Semantic UI kit. Icons: Font Awesome, Ionic and Feather.

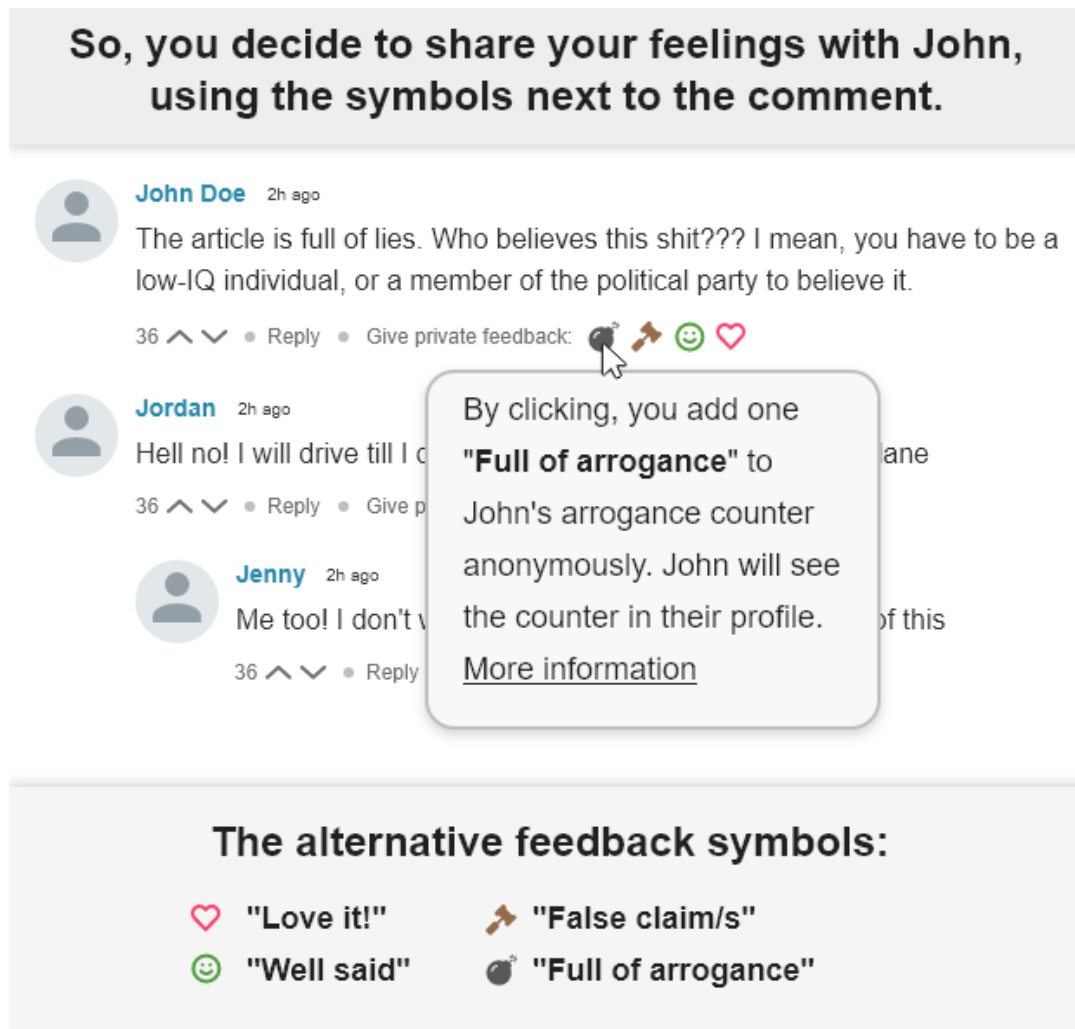


Figure 7: Symbols part 2/3. The following freely available resources were used in making the designs: Semantic UI kit. Icons: Font Awesome, Ionic and Feather.

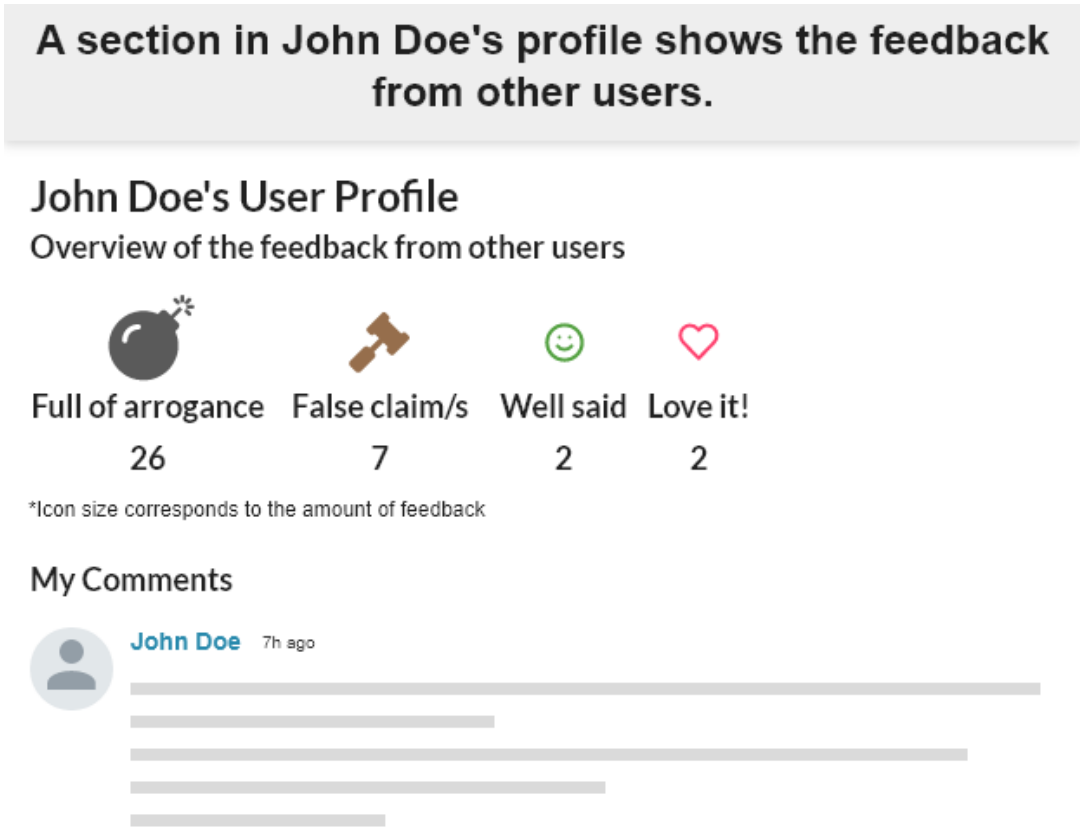


Figure 8: Symbols part 3/3. The following freely available resources were used in making the designs: Semantic UI kit. Icons: Font Awesome, Ionic and Feather.



Figure 9: Creature part 1/2. The following freely available resources were used in making the designs: Semantic UI kit. Icons: Font Awesome, Ionic and Feather.

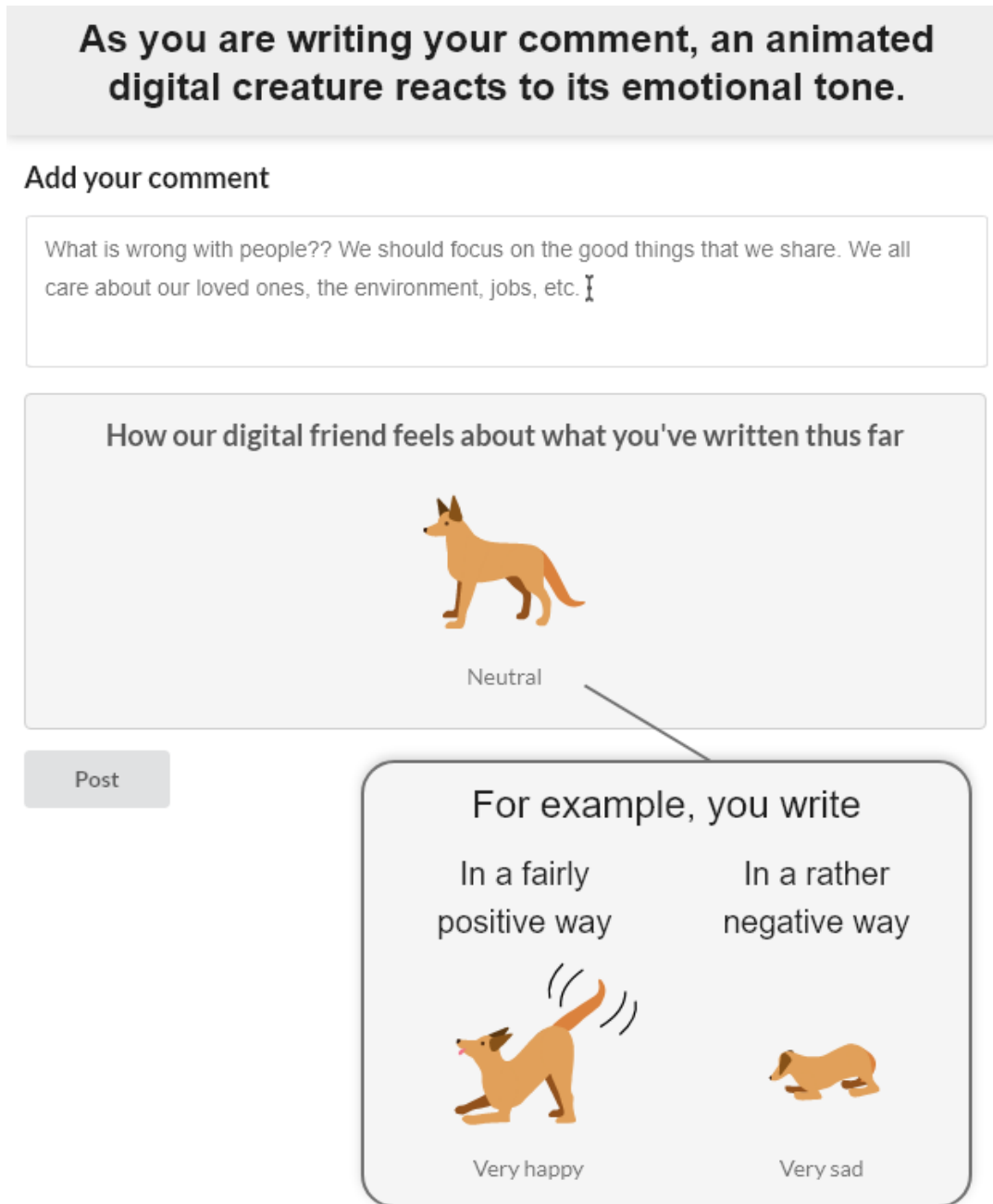







Figure 10: Creature part 2/2. The following freely available resources were used in making the designs: Semantic UI kit. Icons: Font Awesome, Ionic and Feather.



Figure 11: Evaluate part 1/2. The following freely available resources were used in making the designs: Semantic UI kit. Icons: Font Awesome, Ionic and Feather.

When you click to "Comment", you first need to tell how you feel before adding your comment.


1. Please tell which of the following best describes how you feel after reading the news:

Very negative Negative "meh" Positive Very positive

2. Add your comment

Figure 12: Evaluate part 2/2. The following freely available resources were used in making the designs: Semantic UI kit. Icons: Font Awesome, Ionic and Feather.

You are reading the comments to an interesting but divisive news article. The problematic comments and comment threads are marked with an  icon.

Comments



















-  **Matt** 2h ago
I remember seeing these news in the 80s. The history repeats itself, again. The Z-generation shouldn't be scared, we've lived through worse.
12   • Reply
-  **John Doe** 2h ago 
The article is full of lies. Who believes this shit??? I mean, you have to be a low-IQ individual, or a member of the political party to believe it.
36   • Reply
-  **Jordan** 2h ago 
Hell no! I will drive till I die, and I sure as heck will travel by plane
23   • Reply
-  50%
Negative thread
-  **Jenny** 2h ago
Me too! I don't want to change my lifestyle because of this
24   • Reply
-  **Riley** 2h ago
Now this is what I call journalism, great job!
36   • Reply

Figure 13: Philosophy part 1/2. The following freely available resources were used in making the designs: Semantic UI kit. Icons: Font Awesome, Ionic and Feather.

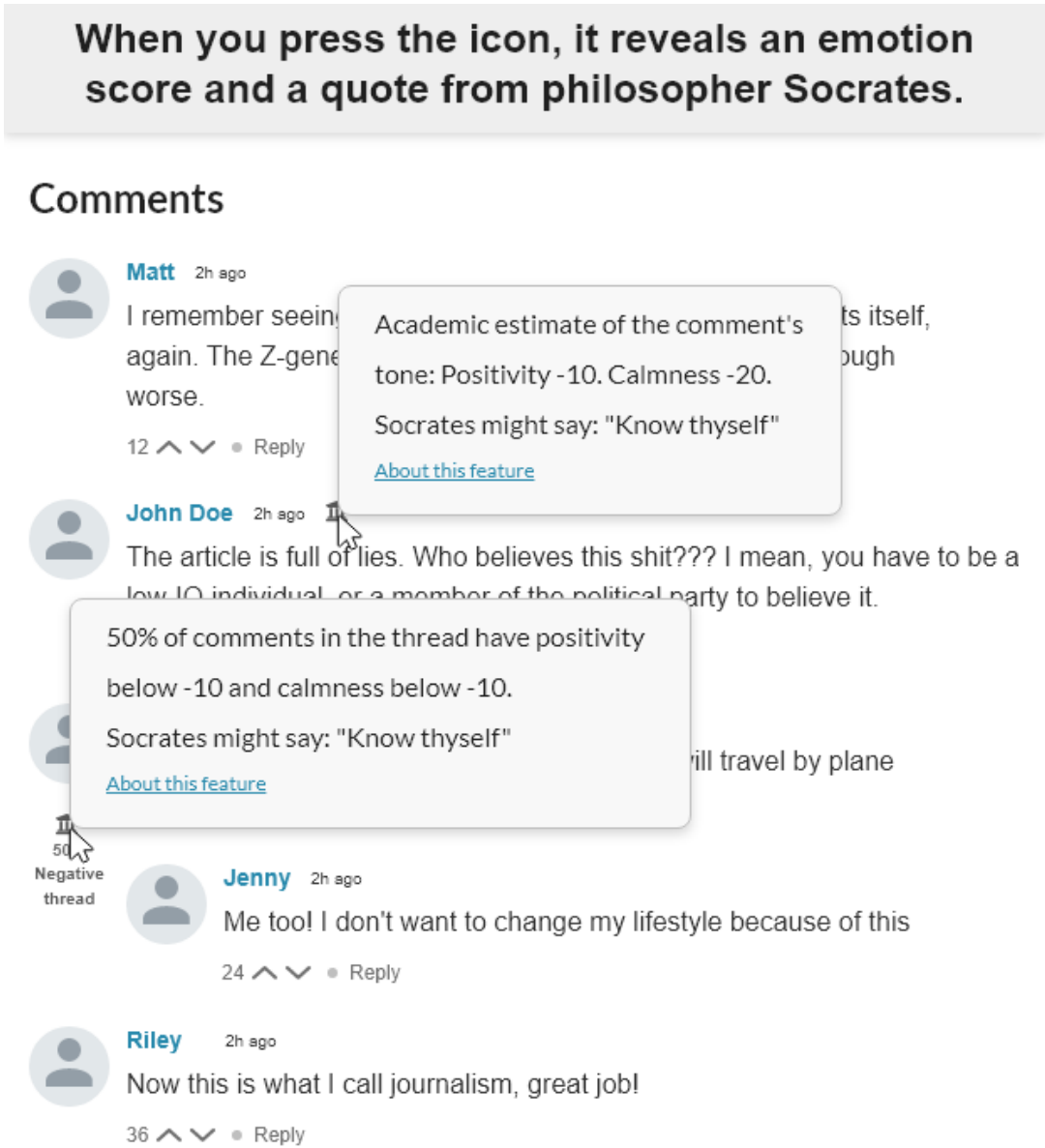


Figure 14: Philosophy part 2/2. The following freely available resources were used in making the designs: Semantic UI kit. Icons: Font Awesome, Ionic and Feather.

You, Anon123 are reading a news article online

Breaking News: Political Division all Time High

Political polarization – the vast and growing gap between liberals and conservatives, Democrats and Republicans – is a defining feature of American politics in 2029. 46% of U.S. citizens, almost all of them Republican, say the president did something wrong regarding the Gulf of Mexico oil spill and that it was enough to justify her removal from office. Another 28% of U.S. citizens say the president did something wrong but that it was not enough to warrant her removal, while 25% say she did nothing wrong.

..and then you post an angry comment on it.

The article is obviously full of lies. Only a low-IQ individual, or a party voter can believe this crap.



Post

Figure 15: Regret part 1/5. The following freely available resources were used in making the designs: Semantic UI kit. Icons: Font Awesome, Ionic and Feather.

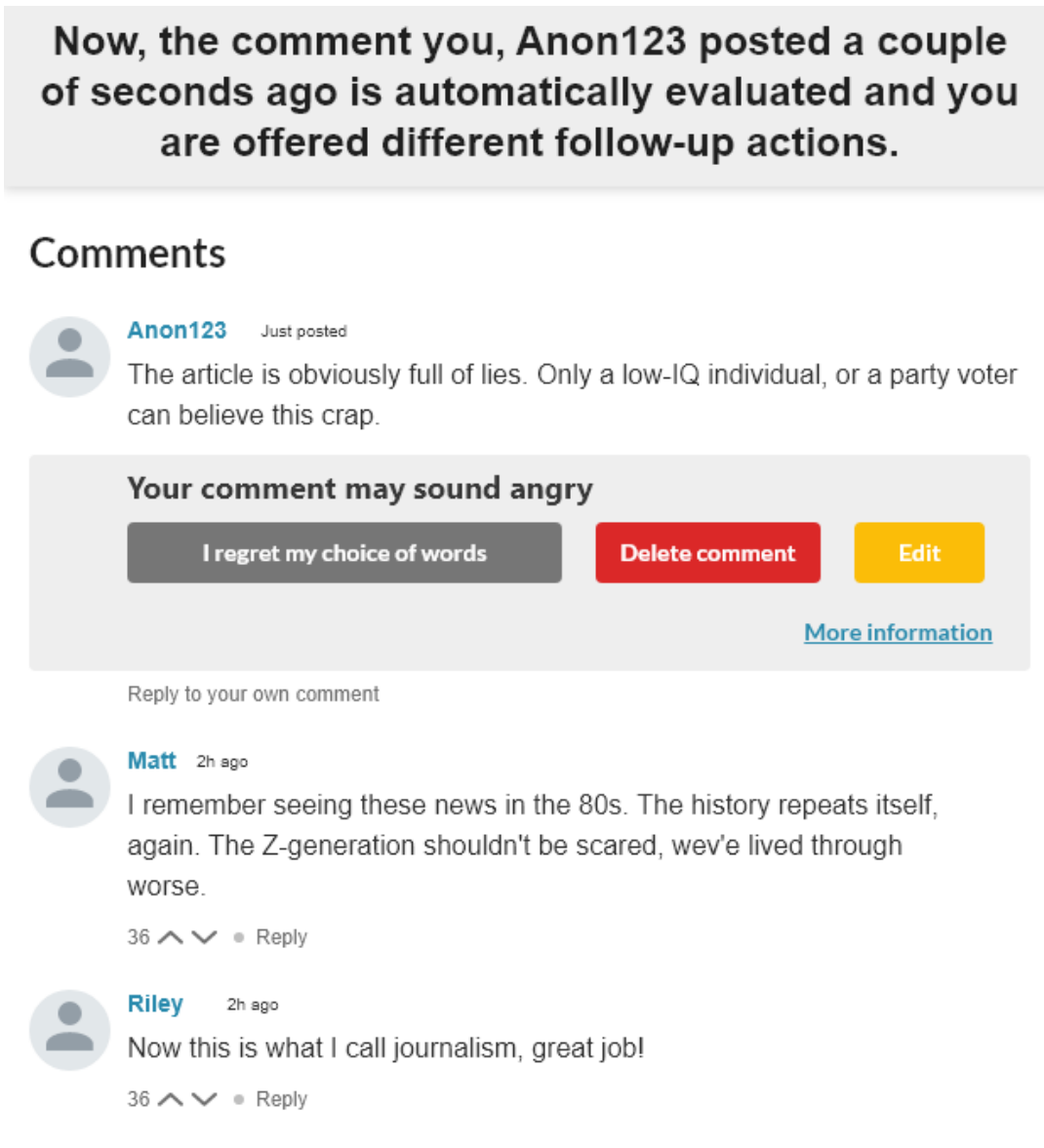


Figure 16: Regret part 2/5. The following freely available resources were used in making the designs: Semantic UI kit. Icons: Font Awesome, Ionic and Feather.

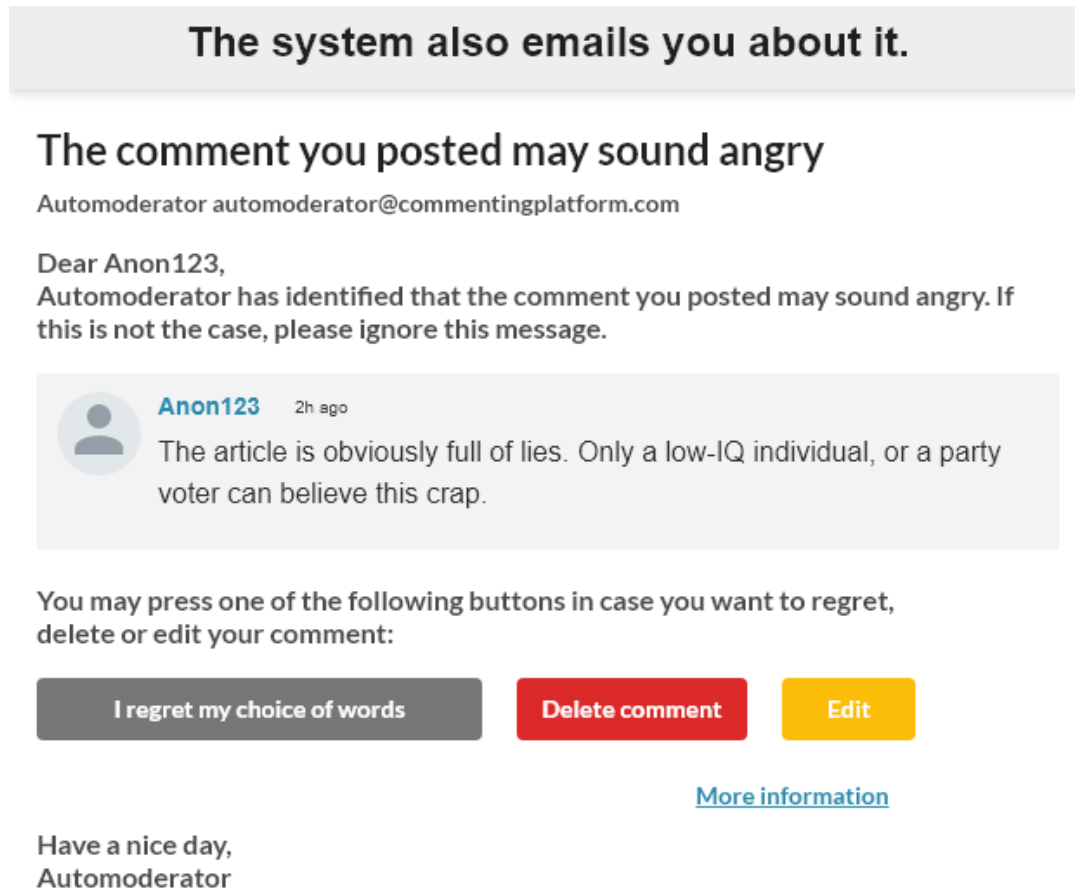


Figure 17: Regret part 3/5. The following freely available resources were used in making the designs: Semantic UI kit. Icons: Font Awesome, Ionic and Feather.

After thinking about it, you decide to use the Regret feature. A special label is added to your comment.

Comments



Anon123 2h ago

The article is obviously full of lies. Only a low-IQ individual, or a party voter can believe this crap.

Anon123 regretted their angry words

[About this feature](#)

Reply to your own comment



Matt 2h ago

I remember seeing these news in the 80s. The history repeats itself, again. The Z-generation shouldn't be scared, we've lived through worse.

36 ^ v • Reply



Riley 2h ago

Now this is what I call journalism, great job!

36 ^ v • Reply

Figure 18: Regret part 4/5. The following freely available resources were used in making the designs: Semantic UI kit. Icons: Font Awesome, Ionic and Feather.

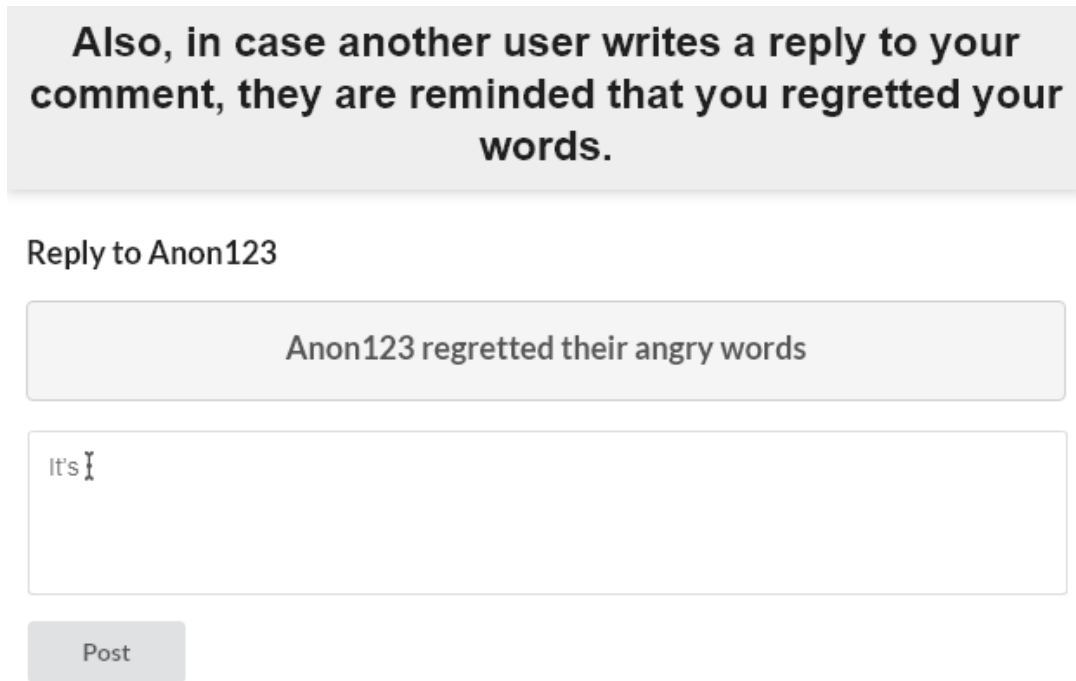


Figure 19: Regret part 5/5. The following freely available resources were used in making the designs: Semantic UI kit. Icons: Font Awesome, Ionic and Feather.

You are reading a news article online

Breaking News: Political Division all Time High

Political polarization – the vast and growing gap between liberals and conservatives, Democrats and Republicans – is a defining feature of American politics in 2029. 46% of U.S. citizens, almost all of them Republican, say the president did something wrong regarding the Gulf of Mexico oil spill and that it was enough to justify her removal from office. Another 28% of U.S. citizens say the president did something wrong but that it was not enough to warrant her removal, while 25% say she did nothing wrong.

..and then you press "Comment."



Figure 20: Audience part 1/2. The following freely available resources were used in making the designs: Semantic UI kit. Icons: Font Awesome, Ionic and Feather.

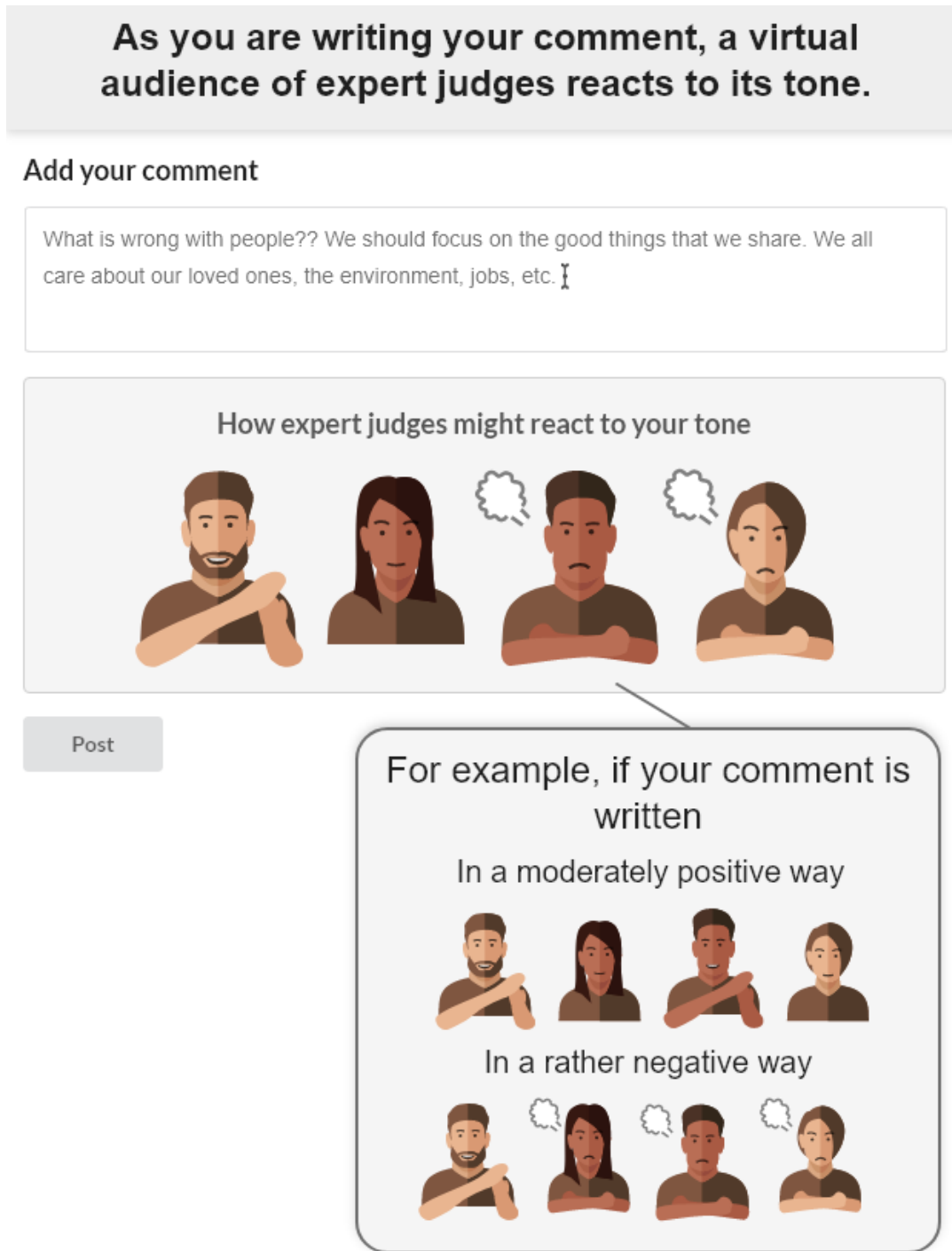


Figure 21: Audience part 2/2. The following freely available resources were used in making the designs: Semantic UI kit. Icons: Font Awesome, Ionic and Feather.

You are about to read the comments to an interesting but divisive news article. You are shown a notification about the argumentation that the comments include.

Breaking News: Political Division all Time High

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 **The discussion around this article contains** ✕
10% Hatefulness 5% Provocation 5% Encouragement 5% Agreement

Comments


 **Matt** 2h ago
I remember seeing these news in the 80s. The history repeats itself, again. The Z-generation shouldn't be scared, we've lived through worse.

Figure 22: Warning. The following freely available resources were used in making the designs: Semantic UI kit. Icons: Font Awesome, Ionic and Feather.