

Editing Anxiety in Corporate Wikis: From Private Drafting to Public Edits

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Abstract. Wikis promote work to be reviewed *after* publication, not before. This vision might not always fit organizations where a common employee concern is that sharing work-in-progress may negatively affect the assessments they receive. This might lead users to edit in distress, thus affecting task performance, and may minimize their participation in wikis. On this premise, this work advocates for complementing wiki editing with in-line drafting. By “drafting” is meant the personal process of collecting references or gradually forging a new structure of ideas, till the result is good-enough to be published. By “in-line”, we highlight that drafts will end up being article edits, and as such, their elaboration should take place *within* the wiki rather than being offloaded to third-party tools. This vision is realized by *Wikinote*, an extension for *Google Chrome* that leverages *MediaWiki’s Visual Editor* with drafting facilities. First evidence indicates that *Wikinote* reduces contribution judgement anxiety, and to a lesser extent, editing anxiety.

Keywords: Wikis · Note-taking · Editing anxiety

1 Introduction

Wikis have recently erupted on to the Knowledge Management scene. However, their organizational and social impact is not yet fully understood. Wikis enjoy a great popularity partially due to the success of *Wikipedia*. Key to this success is a crucial innovation in the publishing model: review work *after* publication, not before [18]. This approach has been extremely successful for open communities. Spurred by this success, organizations have rushed to tap into this facility for knowledge sharing and co-creation [14–16, 21]. Specifically, wikis have been suggested as “a place for *ideation* to occur by providing an open and democratic environment for individuals and teams to share ideas. Wikis’ open and organic nature can allow the capture of ideas quickly and promotes the growth of ideas as they develop” [20]. However, the basis on which *Wikipedia’s* success is based might not apply to other organizations. *Wikipedia* culture is characterized by volunteer, hobbyist, potentially anonymous, peer-based, no-deadline,

factual contributions. If these contextual factors change, then results might vary [9,11]. Moving from open communities to closed organizations might change these contextual factors (e.g. named contributions, existence of power relationships, possible compulsory editing). This begs the questions as to whether wikis are still “a place for ideation to occur”.

Today’s wikis support collaborative writing. However, ideation (a.k.a. idea generation) precedes writing. Flower states that “a writer in the act of discovery is hard at work searching memory, forming concepts, and forging a new structure of ideas, while at the same time trying to juggle all the constraints imposed by his or her purpose, audience, and language itself ...This act of creating ideas, not finding them, is at the heart of significant writing” [8]. Open wikis suggest that these activities (i.e. searching memory, forming concepts, forging a structure of ideas) are collaboratively fleshed out. However, when wiki content goes beyond facts to enter the fuzzy realms of ideas, this model is challenged. For enterprises, Lykourantzou et al. report that a common employee concern is that sharing work-in-progress may negatively affect the assessments they receive [15]. This might be due to corporate users “often feel strong personal ownership of content they add (and are organizationally accountable for it) and a corresponding unwillingness to edit content *owned* by others”. This leads some authors to state that enterprises often use wikis as a technology but let the wiki philosophy of openness leave behind [18].

These insights undercut the usage of wikis for idea generation in organizations. Yet, wikis are being used for other Knowledge Management activities [14], and hence, wikis might well be the place where ideas arise. Studies recommend anchoring ideas at the place where they emerge for easy remembering and contextualization [1]. This raises this paper’s research question: *how to reconcile the convenience of elaborating ideas within the Corporate wiki while, at the same time, overcoming the reluctance to publish work-in-progress.*

To this end, we advocate for complementing the *review-after-publication* wiki model with *in-line drafting*. “*In-line*” indicates that drafting should occur within the wiki. “*Drafting*” suggests that idea generation is not off-the-cuff. Rather, ideas are the result of a crafting process where contribution opportunities are first spotted; next, raw material is collected and elaborated upon, till it eventually ends up as a draft ready to be published. This paper delves into *in-line drafting* as follows:

- providing a model for in-line wiki drafting (Section 2),
- realizing this model through *Wikinote*, a browser extension on top of *MediaWiki’s Visual Editor* (Section 3), and
- validating this extension through the *Wiki Anxiety Inventory-Editing* questionnaire [3] (Section 4).

The latter supports the hypothesis that *Wikinote* reduces user anxiety when contributing to a Corporate wiki. We hypothesize that the fact that *Wikinote* allows users to share ideas once in a mature state is the major anxiety reducer, hence increasing positive affect towards wiki editing and reducing contribution judgement anxiety.

2 Theoretical Framework

This section looks into what compels people to edit in a wiki. According to one hypothesis [4], people contribute to solve cognitive incongruities between the current state of a wiki article and their own knowledge. Cress et al. hypothesize that the likelihood for this to happen is a function of two features: the size of the incongruity between the individual’s knowledge and the wiki’s information on the one hand, and the valence which the topic has for people on the other hand¹. Cross et al. conclude that “only a medium-level incongruity causes a cognitive conflict which motivates people to engage” in wiki editing [4]. According to this model, the flow between the social system (i.e. the wiki) and the cognitive systems (i.e. the individual) is regulated along two processes:

- *Externalization*. For contributing to the development of a wiki, people first have to externalize their knowledge. For that purpose, a person’s own knowledge has to be conveyed into a wiki article in a form that maps the person’s knowledge. The mental effort necessary for the externalization can extend people’s individual knowledge, because externalization requires deeper processing and clarification.
- *Internalization*. Inter-individual knowledge transfer and collaborative knowledge building take place when people have the opportunity to work with a wiki and to internalize the information available in the wiki. This individual knowledge is enriched in two ways: (1) absorbing facts already existing in the wiki and (2), developing new knowledge as a result of the existing personal knowledge being somehow challenged by the wiki facts (a.k.a. emergent knowledge). The latter is described through Piaget’s model of equilibration where the learning trigger is the cognitive conflict between individual knowledge and external knowledge (e.g. the one in the wiki).

Externalization and internalization intermingle to output collaborative knowledge building, and emergent knowledge creation. This model might well explain people’s impulse to edit on open wikis. However, Corporate wikis bring into play other considerations. For a *Justin Bieber* fan who spots a mistake on *Bieber’s Wikipedia* article about his birthday date, the high valence of the topic, the easily-identifiable incongruity, and the lightweight effort required, will most likely lead to restore coherence (i.e. editing Bieber’s article, and correct the date). But, what if the incongruity emerges when reading a workmate’s edit in the Corporate wiki? Unlike the *Bieber* example, this alters both the subject matter and the context:

- *Subject matter: facts vs. ideas*. Encyclopaedia entries tend to be about facts. For instance, *Wikipedia* articles *must* not contain original research. That is, there is no room in *Wikipedia* to refer to “material for which no reliable,

¹ Valence, as used in psychology, especially in discussing emotions, means the intrinsic attractiveness (positive valence) or aversiveness (negative valence) of an event, object, or situation (*Wikipedia*).

published sources exist. This includes any analysis or synthesis of published material that serves to reach or imply a conclusion not stated by the sources”². We depart from this setting to move to idea generation, i.e. the process whereby ideas are created. Unlike facts, idea elaboration goes beyond writing. Ideas need first to be articulated, structured and worked out in a way that others can understand it. Here, externalization is more costly and time consuming, and on top of that, the employee’s prestige might be at stake.

- *Context: open vs. close.* Prestige and power relationships might act as stressors, making people reluctant to expose edits prematurely. People perhaps are afraid of making incorrect statements, or they feel that they have not reflected upon their contributions long enough to write them down. This results in *editability anxiety* and *contribution judgment anxiety* [3].

This new setting might prevent “the incongruity impulse” from surmounting the larger externalization effort and the anxiety brought by peer pressure. Notice however that the impulse is still there. The issue is how to channel this impulse into a medium-run effort that increases the chances of ending up in an edit. Our premise is that personal drafting might be such a channel, and that *publishing more elaborated edits might reduce both editability anxiety and contribution judgment anxiety, hence, leading to a more participatory wiki.* This begs the question of what is meant by “elaborated edits”, i.e. how much elaboration is needed before being ready to publication.

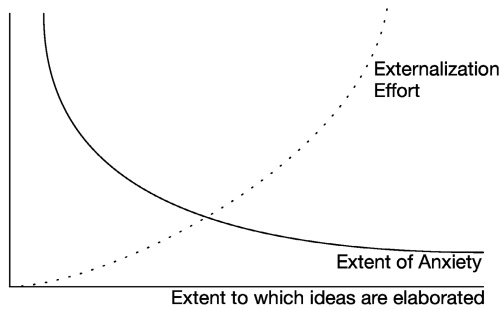


Fig. 1. Finding a balance between the externalization effort and the anxiety growth w.r.t. the degree of elaboration of edits

Figure 1 sketches the likely tension between the externalization effort and the anxiety growth w.r.t. the degree of edit elaboration. If edits are published prematurely, then it might have a negative impact on the user prestige, hence, increasing user anxiety and eventually, putting users off. However, if users wait for edits to be fully elaborated, then the externalization effort increases, and so

² http://en.wikipedia.org/wiki/Wikipedia:No_original_research

do the chances of conflicts with other wiki users, both aspects also discouraging editing. Our hypothesis is that a compromise can be found for “**paragraph edits**” (approx. less than 300 characters) where the upfront investment of externalization pays off in terms of a reduction in anxiety.

Previous considerations guide our design of a wiki-specific drafting facility, namely:

- Internalization (specifically, emergent knowledge) results from being exposed to the wiki where “the cognitive conflict” emerges. This sustains *in-line* drafting.
- Externalization does not require the interaction with other people in a narrow sense. People can externalize their knowledge (and thereby extend their own knowledge) without necessarily addressing other people in the first place. This sustains *personal* drafting.
- Externalization might imply an important upfront investment that can later be challenged by the community. This sustains *paragraph* drafting (as opposed to document drafting) as a “breakeven point”.

The next section addresses how these insights guide *Wikinote* design.

3 Facilitating Externalization: The *Draft* Mode

This section advocates a third wiki mode: the *draft* mode. Today’s wiki engines support two main modes: the *edit* mode (for article editing) and the *talk* mode (for article discussion). The *draft* mode departs from existing modes in the following aspects:

- Storage. Traditional modes (i.e. *edit* and *talk*) differ in the subject matter (article content *vs.* article discussion) but the text is readily made public (i.e. moved to the *MediaWiki* database server). In contrast, when on the *draft* mode, edits are local, i.e. no trace is left on the *MediaWiki* database but on the browser local storage.
- Rendering. Traditional modes promote contribution through WYSIWYG editors: no difference between the existing content and the new additions. By contrast, draft edits are better reflected in a change-control manner.
- Lifecycle. In traditional modes, edits are readily followed by publication. In contrast, drafts go through a maturity process before being published.

Figure 2 depicts the *idea maturity model* along the following landmarks: *spark*, *gather*, *elaborate* and *consolidate*. Each landmark has a GUI counterpart. *Wikinote* extends *MediaWiki’s Visual Editor*³ with the *draft* mode, i.e. a set of Graphical-User Interactions (GUIs) that realize each of the abovementioned actions. *Wikinote* has been tested with *Google’s Chrome* version 39, *MediaWiki’s* version 1.25 and *Visual Editor’s* version 0.1.0. It is available at the *Chrome Web Store*: <https://chrome.google.com/webstore/detail/lohjainijkgonhljngepoaphjpljeiii>. Next, we

³ <http://en.wikipedia.org/wiki/VisualEditor>

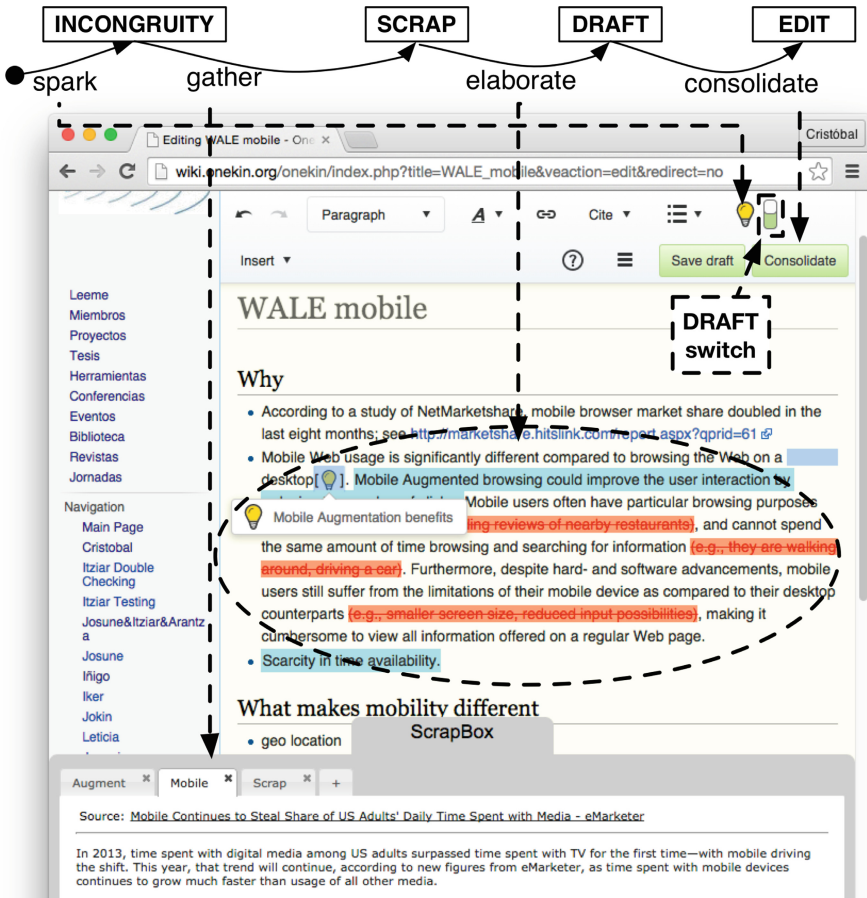


Fig. 2. The Idea Maturity Model: from “light-bulb” moments to public edits

describe each action’s purpose and its support in *Wikinote*. These actions become available as soon as the user puts the *draft switch* on. Worth noticing the *draft mode* only makes sense for contributions of a certain calibre and size. Typo corrections and minor rewritings are not worth the effort.

3.1 Spark

Purpose. Firstly, we consider the process of translating a thought into a physical or digital format. The “light-bulb moment” can come at any time. It might well happen when the user is engaged in other activities with no time to further elaborate the idea. Frequently, users resort to digital/physical artefacts (e.g. *Post-it* notes) to record the idea. This calls for capturing ideas at the place where they arise. In addition, it contextualizes the idea by the setting where it emerges, hence, facilitating recovering [1].

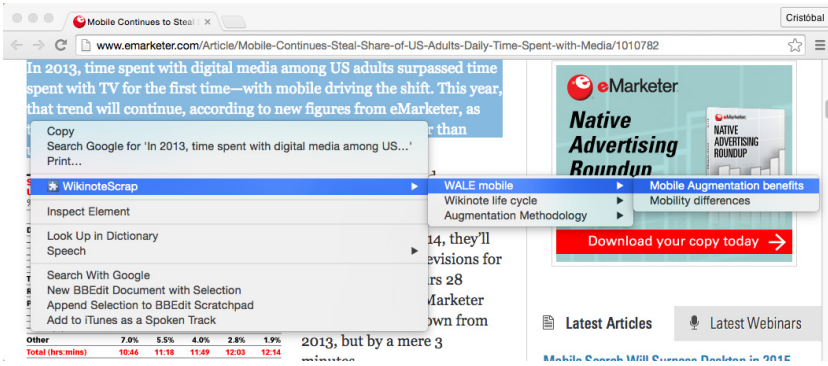


Fig. 3. Scrap capture through nested right-click contextual menus. Once *WikinoteScrap* is selected, the next menu lists the wiki articles the user is working on. For each article, current “bulbs” are displayed. The scrap is attached to the highlighted “bulb”. Once saved, the scrap (i.e. selected text + current URL + page title + date) is available in the scrap box (see Figure 2).

Realization. In a wiki setting, ideas/incongruities might show up when reading wiki content. To not distract users from their current reading flow, *spark* aims only at noting the incongruity for later attention. The important point is the capture speed. Even seemingly minor difficulties or annoyances with tools could deter use of a tool. Striving to mimic wiki’s WYSIWYG editor, incongruities are noted in a very similar way to wiki references. Wikis’ bibliographical references are denoted as superscripts. Likewise, incongruities are conceived as “cognitive references”, and denoted as “bulb” superscripts (see Figure 2). Select the text causing the incongruity, click the “bulb” icon in the editor bar, and a menu pops up to request the incongruity’s rationale (e.g. “Mobile Augmentation benefits”). This rationale will act as the “bulb” label for later indexing (see later). On acceptance, the “bulb” superscript appears by the wiki sentence.

3.2 Gather

Purpose. Externalization is not a one-shot process but time is needed for the idea to mature. This might imply collecting evidence, thoughts and references that can be sought on purpose or stumbled upon. This is realized in terms of **scraps**. While bulbs act as reminders, scraps refer to generally small, disconnected sentences that develop some of the twist brought about by the incongruity. Hence, scraps do not exist in a vacuum but qualify an incongruity.

Realization. Again lightweight mechanisms become a must for both scrap gathering and posterior recovering. Coming across an interesting scrap might well occur when users are performing some other attentionally engaging primary tasks. For this reason, lowering both the actual and perceived cost of cognitive and physical effort may improve gathering.

Scraps can be originated in different settings: when reading the wiki, when browsing the web, when reading an article at the desktop, when traveling, etc. So far, *Wikinote* supports two settings. In both cases, gathering is a click away:

- When browsing the Web, the right-click contextual menu has been extended with the *WikinoteScrap* menu (see Figure 3). Select the content to be gathered from the current page, right click, and a menu pops up for the user to indicate the bulb label to which this clipboard-generated scrap is going to be attached to.
- When reading the wiki, manually-typed scraps can be created. Select first a “bulb”, and next, click on the “+” icon to create a scrap associated with this bulb.

No matter how they are obtained, scraps are collected into **the scrap box** (see Figure 2). *Wikinote* only shows those scraps attached to the currently-selected “bulb”. Move to a different “bulb”, and so will do the scrap box. If no “bulb” is selected, the scrap box hides behind the namesake tab, so that it does not interfere with the reading.

3.3 Elaborate

Purpose. So far, the article’s content has been left untouched. Except for the “bulb” annotation, we have not yet addressed changes on the content of the article. This has been so for presentation sake. Actually, users might change article content at wish. Nevertheless, directly changing article content makes sense for minor edits (e.g. typos, spelling mistakes, etc.) but this is not the scenario under consideration. Rather, we target changes that require some previous elaboration before being substantiated as article paragraphs. “Bulbs” and scraps help to stage this development that will eventually produce a **draft**, i.e. a set of changes on the article content that stands for a meaningful unit to tackle a given “bulb”.

Realization. This action does not imply a change on the WYSIGYG way in which users are accustomed to modifying the article’s content. However, and unlike *Visual Editor*, modifications are reflected in a change-control manner. This is recommended when working on top of somewhere else’s content. Besides acting directly upon the wiki content, users might also drag&drop scraps. This permits first working on the scrap box (e.g. rephrasing/tinging content obtained from the Web, merging scraps which convey a similar argument, etc.) till a scrap is elaborated enough to be moved to the content canvas. The scrap then becomes part of the draft.

Two aspects are worth noticing. First, the scrap’s references are automatically attached to the so-generated draft’s paragraph. In this way, *Wikinote* automatically supports provenance, i.e. keeping track of the sources. Second, draft changes are local, i.e. they have any no impact on the content of the underlying article. Except the author, no one can yet see the draft. Basically, actions *gather* and *elaborate* intertwine to gradually produce the draft. During this process, the underlying article can be changed by other wiki users. Those changes are

visible for the draft author. On the upside, this implies that draft authors are always aware of the most recent version of the article. On the downside, article upgrades might unsettle draft edits. Indeed, drafts are implemented as *layers* on top of the article content, i.e. draft edits are “anchored” to the article content. Different mechanisms are implemented to make drafts resilient to changes on the underlying article content [5]. Nevertheless, it can happen that the article text that underpins a draft annotation is eventually removed⁴. In this case, the annotation becomes dangling, and it is up to the author to re-anchor it again. Eventually, the draft is ready for consolidation.

3.4 Consolidate

Purpose. *Consolidate* is the process whereby drafts become published, i.e. all the article’s drafts are publicly exposed as if they were a single *MediaWiki* edit.

Realization. The “*Consolidate*” button achieves this transition. From an external reader, no differences should exist between edits achieved via *Visual Editor* or those obtained through *Wikinote*. Only the *edit summary*⁵ reflects the origin of the edit. An edit summary is a brief explanation of an edit to a wiki page. For *Wikinote* edits, this summary is automatically generated indicating the fact that this is a *Wikinote* edit. The summary also includes the incongruity rationale that triggered the edit in the first place.

4 Evaluation

Wikinote aims at reducing anxiety users might feel when editing a Corporate wiki, thus fostering contributions. This section evaluates whether *Wikinote* fulfils such a goal while intending to quantify its effect. The driving hypothesis follows:

Wikinote reduces user anxiety when contributing to a Corporate wiki.

In a Corporate setting, users edit a wiki on a normal basis. Hence, we opted for evaluating *Wikinote* in their normal environment instead of bringing participants to a laboratory, where the anxiety motivated by the setting itself could interfere with our measures. The following section delves into the details of the experimental design.

4.1 Experimental Design

We state the **goal of the experiment** using the Goal/Question/Metric (GQM) method: *analyse* the wiki anxiety of users working with *Wikinote*, *for the purpose of* comparing it with a baseline alternative (*MediaWiki* alone), *with respect to*

⁴ Text re-allocation is not a big issue since annotations move along their anchoring text.

⁵ http://en.wikipedia.org/wiki/Help:Edit_summary

user anxiety, *from the point of view of* a researcher trying to assess *Wikinote*, *in the context of* user's usual wiki editing activities.

Wikinote, or the lack thereof, will be the *independent variable*. The anxiety users feel when editing the wiki will be the *dependent variable*. These variables lead to a unifactorial design [19]. As we want to evaluate the difference *Wikinote* introduces, we designed an experiment with repeated measures, where the same participants edited with and without *Wikinote*. In order to counteract the impact of the order in which participants edited, we counterbalanced it, i.e. half of the participants first edited without *Wikinote* and then tried it whereas the other half performed the edits in the opposite order.

Wiki anxiety was measured using the *Wiki Anxiety Inventory-Editing (WAI-E)*, a questionnaire that has shown high validity and reliability ($\alpha = 0.93$) [3]. This instrument presents significant and strong correlation with state anxiety measured directly after wiki editing [$r(48) = 0.73, P < 0.001$] as well as with fear of negative evaluation [$r(48) = 0.42, P = 0.002$]. It, however, has not shown significant correlation with trait anxiety [$r(48) = 0.27, P = 0.06$], suggesting that the anxiety it measures is more based on the context of a wiki edit than on the traits of the users performing it. A component analysis of WAI-E revealed three factors that explain 62% of the variance. They were termed *positive affect*, *editability anxiety*, and *contribution judgement anxiety* that allow understanding different aspects of user anxiety in wiki editing [3].

Participants were recruited at the Computer Science Faculty of the University of the Basque Country using volunteer sampling. Three faculty members and five Ph.D. students, who all use a wiki on a daily basis in the context of a research group, answered the call. In particular Ph.D. students use the wiki as the main means to summarize their work and discuss it with their advisor. The experiment took place over a week and a half. The aim was to compare Wikinote (i.e. in-line drafting) with the baseline case (i.e. traditional review-after-publication as supported by MediaWiki). Since *editability anxiety* very much depends on what is being written and who reads it, we did not devise specific tasks but instructed participants to keep writing their reports in the wiki as usual. To counterbalance the effect of tool order (i.e., with and without Wikinote), participants were randomly assigned to two groups. The first group was asked to fill out the WAI-E questionnaire shortly after it had performed a substantial edit to the wiki (i.e., one that involved at least two paragraphs). They were given Monday and Tuesday for this task. Wikinote was then presented to both groups in a 45' session on Wednesday. Next, both groups were requested to complete the WAI-E questionnaire after a substantial edit they made using Wikinote during Thursday or Friday. Lastly, participants in the second group were asked to uninstall Wikinote and to answer the WAI-E questionnaire after a substantial edit during the following Monday or Tuesday, this time without Wikinote. In all cases, participants were requested to start the questionnaire (see less Table 1) than five minutes after the edit, so that the state anxiety generated by the wiki editing could be measured.

Table 1. Descriptive Statistics for WAI-E items

	Baseline		Wikinote	
	Mean	SD	Mean	SD
I felt confident when contributing to the wiki	3.25	1.04	4.25	0.46
I felt excited when editing the wiki	2.25	0.89	3.75	0.71
I felt comfortable about editing the wiki	2.75	0.89	4.63	0.52
I was happy to contribute content to the wiki	3.13	1.13	4.25	0.71
I felt secure when editing the wiki	2.63	0.74	4.63	0.52
I felt relaxed whilst editing the wiki	2.38	1.19	4.38	0.52
I felt at ease editing the wiki	2.38	0.52	3.88	0.64
I was confident that the information I was contributing was correct	3.13	0.83	3.75	1.04
I felt intimidated while editing the wiki	2.88	1.13	1.75	0.71
The fact that the content could be changed made me uneasy	2.63	1.19	1.88	0.64
I was worried about making a mistake that I could not correct when editing the wiki	3.13	1.25	1.63	0.52
It scared me to think that I could accidentally destroy somebody else's content	3.38	1.30	1.88	0.64
I was nervous about changing existing content on the wiki	3.38	1.30	1.75	0.46
I was afraid that I might do something wrong when editing the wiki	3.38	0.92	1.50	0.53
I was certain I could overcome any difficulties I encountered in editing the wiki	2.88	0.99	3.50	0.93
I was concerned that people would know it was me that was contributing to the wiki	3.13	1.13	2.63	1.31
I was afraid that people would find faults with any edits I made	3.50	1.31	2.25	0.71
Thoughts about being judged by other users made me feel tense	3.62	1.19	2.75	1.04
I was nervous of what other users might think of my edits	3.38	1.30	2.00	0.93
I felt apprehensive when editing the wiki	3.13	1.13	2.13	0.64
When editing the wiki I felt anxious about making a mistake	3.50	1.31	1.88	1.13
I found it hard to concentrate when editing the wiki	2.88	0.83	2.38	0.92

4.2 Analysis

The data collected did not fulfil the assumptions of parametric tests. Specifically, Shapiro-Wilk tests showed a significant deviance from normality (as we had less

than 50 subjects). Hence, we resorted to non-parametric Wilcoxon signed-rank tests for this analysis. Eight subjects participated in the experiment (3 lecturers and 5 Ph.D. students), of whom 50% were male and 50% female. Regarding age, the average was 32.5 years with a standard deviation of 8.14. All of them use a wiki on a normal basis as part of their work: they all add content to a wiki from one to five times a week. Table 1 shows the descriptive statistics for the WAI-E items. All items correspond to a five point Likert scale (1-Strongly Disagree, 5-Strongly Agree).

Table 2. Test Results

	Baseline		Wikinote		T	p	r
	Mean	SD	Mean	SD			
WAI-E	71.13	17.41	43.38	8.39	-2.37	0.018	-0.592
Positive Affect	21.88	5.19	33.50	3.38	2.53	0.011	0.633
Editability Anxiety	19.00	5.86	11.13	1.36	-2.25	0.025	-0.563
Contribution Judgement Anxiety	17.13	6.06	11.00	3.85	-2.83	0.017	-0.706

The test outcome is summarized in Table 2. First the mean and standard deviation values of participants' responses to the WAI-E scale and its subscales are presented: *Baseline* stands for editing with MediaWiki built-in facilities whereas *Wikinote* refers to editing with the namesake extension. *T* and *p* columns represent the *T* value of the Wilcoxon signed-rank test and the significance, respectively. In metrics where statistically significant differences were found (i.e., $p < 0.05$), the effect size was calculated using *r*. A value of this parameter above 0.5 in absolute values denotes a large effect size as a result of the independent variable (i.e., the use of *Wikinote*). The *r* values are presented in the last column of the table.

These preliminary results show that there is a statistically significant difference when *Wikinote* is introduced as measured by WAI-E, and also, in each of its subscales (i.e., positive affect, editability anxiety and contribution judgement anxiety). *Wikinote* introduces the largest effect in increasing participants' positive affect towards wiki editing ($r=0.633$) and decreasing their contribution judgement anxiety ($r=-0.706$).

All in all, these preliminary results support our hypothesis that *Wikinote* reduces user anxiety when contributing to a Corporate wiki. We hypothesize that the fact that *Wikinote* allows users to share ideas once they are in a mature state is the major anxiety reducer, hence increasing positive affect towards wiki editing and reducing contribution judgement anxiety.

Threats to Validity. A main concern for internal validity is the appropriateness of the sample. The first issue relates to sample size. Even though our results show statistically significant differences and large effect sizes, larger groups are

needed to corroborate these findings. A second issue involves the participants’ background. Participants are technically savvy, which may have had an impact in their attitude towards wiki editing. Moreover, the wiki they work with, is relatively small and only 15 people have access to it. The last issue concerns the external validity. We used an opportunistic sample of faculty and Ph.D. students. We hypothesize that contribution anxiety in a corporate setting might be larger than in academia. While this hypothesis might likely result in *Wikinote* performing better, the different environments might lead to different results. Specifically, *Wikinote* might delay idea sharing, specifically for people too perfectionist or image conscious, hindering the chances of integrating someone else’s viewpoints in the early stage of idea conception.

5 Related Work

Wikinote combines features of an editor (i.e. it acts upon article content), an annotator (i.e. it introduces “bulb” annotations) and a note-taking facility (i.e. the scrap box). This unique blend and its wiki-oriented purpose differentiate *Wikinote* from related tools. The next paragraphs provide a review.

Wiki Editors. *Wikinote* can be aligned with efforts of promoting wiki contribution. Recent research shows that the number of active contributors in *Wikipedia* has been declining steadily for years. The blame is put on the restrictiveness of the encyclopaedia’s primary quality control mechanisms, and the algorithmic tools used to reject contributions [10]. As a result, “both newcomers and experienced editors are moving increasingly toward less formal spaces” [10]. *Wikinote* can be regarded as providing one possible realization of this “less formal” space. In the same vein (i.e. promoting contributions among newcomers), other works give support for validating content (e.g. *ConstrainedWiki* [6]), enhancing content (e.g. *VisualWikiCurator* [13]) or socially elaborating content (e.g. *Teahouse* [17]). *Wikinote* provides a different support by providing a secluded setting for drafting once the article is in full swing.

Note Taking. Note-taking is the practice of recording information captured from another source. In the commercial front, *Evernote* is one of the best-known examples. In academia, *MADCOW* [2] and *SPREADCRUMBS* [12] present similitudes with *Wikinote*: the use of contextual menus for note-taking. Differences stem from the architecture. Both *MADCOW* and *SPREADCRUMBS* resort to a server for note storage. In contrast, we purposefully design *Wikinote* to be uniquely browser-based. No need to open an account in someone else’s server (like in *Evernote*). All *wikinotes* are locally kept. This feature might be specially attractive for organizations that could be reluctant to offload sensitive information into third-party servers. *Wikinote* can afford to limit itself to local storage since it is not thought of for long-term storage (like *Evernote*) but transient memory till the draft gets ready for wiki consolidation.

Annotation Systems. There is a wide range of annotation tools for Web pages (e.g. *Diigo*; see [7] for an overview). An annotation is an added note that explains

something in a text. Hence, annotations are not the text as such but meta-data about the text. Most tools are generic. This is at the same time their strength and their weakness. The advantage is that they annotate no matter the website. The downside is that such decoupling forces users to cope with two different Web experiences: the one of the annotation tool (e.g. *Diigo*) and the one of the annotated website (e.g. *Wikipedia*). By contrast, *Wikinote* explores a different approach: wiki-specific annotation. This accounts for a seamless integration of editing and annotation commands (e.g. the “bulb” icon), hence promoting prompt in-line annotation, and eventually, editing. The bottom line is that if annotation is the prelude of editing, then facilitating annotation becomes a main wiki concern, not to be left to third-party generic software.

6 Conclusions

This study addresses idea generation in Corporate wikis on two main premises. First, incongruities raised during wiki reading may spur contributions. This momentum should be readily captured and sustained as smoothly as possible, and ideally, supported within the wiki realm. Second, lowering the bar for drafting might result in more elaborated edits being published. This, in turn, might decrease both editing anxiety and contribution judgement anxiety. To test this out, a personal in-line drafting browser extension is developed: *Wikinote*. *Wikinote* extends *MediaWiki's Visual Editor* with the *draft* mode. First validations suggest that *Wikinote* is effective in reducing editing anxiety. Additional validations are needed to assess not only effectiveness but also usability. In this respect, we are currently addressing scrap portability, i.e. notes captured by no matter the tool to be easily contextualized/rendered within wiki articles. Specifically, we are planning to capitalize on *Evernote* and *Mendeley* note-taking facilities to be seamlessly accessible through *Wikinote's* scrap box.

Acknowledgments. This work is co-supported by the Spanish Ministry of Education, and the European Social Fund under contract TIN2011-23839 (*Scriptongue*).

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