Web-Based Task Management for Individuals with ADHD Through Contextual Tasks and Progress Cues

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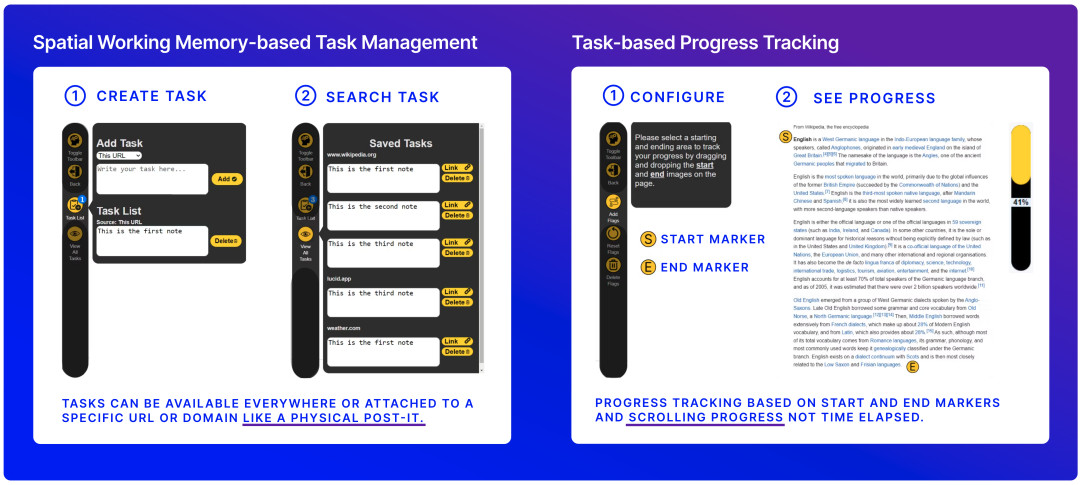


Figure 1: Two main features of the *FocusUp* browser overlay extension. First, spatial working memory-based task management emulates principles behind post-its connected to physical locations. Second, reading progress tracking visualizes actual reading progress, based on custom start and end markers, and not elapsed time.

Abstract

For individuals with ADHD, distracting web content interferes with executive functioning, especially in task management, which is critical for daily routines and academic or workplace success. Traditional task management tools are overwhelmed by an abundance of open tasks. We developed a web browser extension tailored for individuals with ADHD through participatory design, with one of our authors with ADHD collaborating with an ADHD focus group (n=3). The tool features a task-tracking function that utilizes spatial working memory to enhance focus by reducing the number of visible tasks. Additionally, a scroll-position-based progress tracking feature measures task progress, rather than just time elapsed. Both features were evaluated through think-aloud sessions (n=12). Participants suggested additional features and concluded that our context-based task tracking and progress tracking are helpful.

CCS Concepts

• **Human-centered computing** → **Accessibility systems and tools**; **Accessibility technologies**.

Keywords

Accessibility, ADHD, Task Management, Browser, Participatory Design

*Both authors contributed equally.

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1 Introduction and Related Work

Executive function (EF) supports task management, information organization, and sustained attention [10]. For approximately 5% of the population with ADHD [10, 19, 37, 41], EF differences can reduce the effectiveness of conventional task management tools [7, 30]. These differences affect task initiation, prioritization, focus, and recall [10]. Yet, digital and analogue productivity tools often follow a one-size-fits-all approach that overlooks neurodivergent needs [9]. Task trackers may overwhelm users by displaying all tasks simultaneously [14], while progress visualizations often conflict with how people with ADHD experience motivation and time [15]. We address two aspects of task management: task tracking and progress tracking. First, we link tasks to website locations to leverage spatial working memory [1]. Second, we investigate task-based rather than time-based progress tracking for users with ADHD.

Spatial Working Memory: Task management relies on remembering what needs to be done, when, and where it is relevant. Spatial working memory (SWM) refers to the ability to recall physical or abstract locations, such as where keys were left or where a car's hazard-warning button is located [39]. External spatial cues can support task organization, and physical SWM aids, such as location-specific post-it notes, can help compensate for working-memory differences in ADHD [25]. TangiPlan [44], for example, links physical task markers to relevant locations, such as placing a marker beside a toothbrush. Contemporary digital task managers, however, rarely provide equivalent spatial strategies.

Time-based Progress Tracking: Many progress-tracking tools equate elapsed time with progress. Example systems for this are TaskTracker [24] and AID-Watch [40], which further use positive feedback or visual time cues to support engagement. People with ADHD commonly use such timers [16], but this time-based approach has two limitations: elapsed time may not correspond linearly to task progress, and impaired time perception through ADHD can alter interpretations of elapsed or remaining time [6, 10]. Time, therefore, provides an unreliable indicator of task advancement.

Research Gaps and Research Questions: Prior work has examined SWM and progress tracking, but important gaps remain. TangiPlan [44] shows that physical spatial cues can improve task management for people with ADHD, yet digital equivalents are lacking. Likewise, visual time-based trackers do not reflect actual task effort. Addressing the lack of SWM-based digital task management and limited research on task-based progress tracking, we ask:

RQ1: How do task lists, grounded in spatial working memory, impact task management for users with ADHD?

RQ2: How do custom task-based progress indicators influence focus and engagement for users with ADHD?

2 Tool Design & Method for Interviews and Think-Aloud Sessions

Phase (1): Tool Design *FocusUp*. To support individuals with ADHD in maintaining focus and productivity during web browsing, we developed *FocusUp*, a *Google Chrome* extension [2]. The design followed a participatory approach: one author with a formal ADHD diagnosis contributed firsthand insights throughout development, while a dedicated focus group of three individuals with ADHD participated in three sessions (each approximately 60 minutes), conducted online. Participants were recruited through email outreach and announcements shared in ADHD-focused self-help groups and online communities. These sessions covered feature selection, visual design, interaction preferences, and early prototype evaluation through iterative feedback loops. A preliminary survey with 25 ADHD self-identified respondents further surfaced broad patterns in task management behavior, supplementing the participatory sessions by identifying trends explored further in the interview study. The focus group participants were separate from those in Phase 2.

Design Rationale. Three core principles guided the design: supporting goal-directed behavior [3, 23], minimizing cognitive overload [31], and enhancing self-awareness during browsing [11]. These emerged organically from focus group discussions, where frustration with fragmented multi-tool workflows, preference for contextual in-browser reminders over disruptive notifications, and a need for simple visual progress cues collectively shaped our decisions. Customizability was equally central given individual variation in task segmentation and prioritization preferences. As P3 observed, *"feature-heavy systems that require configuration [are] often replaced with simpler solutions."* A persistent overlay architecture was adopted to minimize context-switching, which is a known barrier for individuals with ADHD [14], keeping the interface available without pulling users out of their active browsing environment. These priorities directly informed two core features (see Figure 1; user flow in Figure 2).

Spatial Working Memory-based Task Management links tasks to specific websites or domains, surfacing only contextually relevant tasks [5] — functioning as spatially anchored virtual post-it notes [27]. This reduces task paralysis and supports executive function through externalized structure [29], without the added complexity of unrelated tasks found in static tracking tools [8, 34].

Task-based Progress Tracking targets sustained attention during extended reading and list-based tasks, a recognized challenge in ADHD [20, 22, 36] driven by working memory limitations and attentional dysregulation [33, 45]. Users mark a task-relevant section directly on a webpage, breaking content into smaller goal-bound units with visible progress [20, 38], which helps reduce impulsive tab-switching in distraction-rich online environments [21, 28].

Phase (2): Interview and Think-Aloud Sessions To evaluate the effectiveness and usability of *FocusUp*, we conducted semi-structured interviews and think-aloud sessions with 12 participants, selected based on availability. The demographics of the interview participants are shown in Table 3 in the appendix. Eight participants were formally diagnosed with ADHD by a healthcare professional, while four did not have a diagnosis but self-described themselves as having ADHD or awaited diagnosis. The participants ranged in age from 18 to 38 years, with a gender distribution of 7 males and 5 females. Educational levels ranged from high school to a bachelor's degree. Each interview included three tasks done in the setting of *Wikipedia* articles. Task instructions were detailed (e.g., create a task) and had predefined constraints (e.g., time limits) [4]. The online video interviews lasted approximately 25 minutes in total. The

Table 1: Task Management User Evaluation: Recurrent themes in the interviews and think-aloud sessions.

Theme	Example Quote
Usability and Accessibility	
Simplicity	*The task list is simple to use; I can quickly jot down things without getting distracted. (P8)*
Compact View	*Maybe adding... collapse it so it shows up like a little circle down here, and then I can click it, and it just pops up like this. (P3)*
Clutter	*Because normally, if something is like open, like all this up here is driving me insane. So, I would love to get rid of all this. (P3)*
Convenience	*I would actually do [this on] all websites because so far I like those little extensions here. (P3)*
Font Design	*The font and task reminders are great for ADHD. (P7)*
Auto-Open Tab	*If I had a little link right here to click on it to take me directly to [its connected URL], that'd be cool. (P4)*
Multi-Task Search	*With y'alls, you can have multiple... It would just find these things without me having to... retype it in every single time. (P3)*
Task Management and Productivity	
Task Switching	*I like that I can pull it up anytime I want. (P5)*
Task Reminders	*I don't lose track of what I was doing. (P7)*
Prioritization	*It would be nice if I could organize or prioritize my tasks in some way. (P8)*
Productivity	*It's ten times better than the way I currently manage tasks... because I really don't manage tasks at all. (P6)*
Customizability and Flexibility	
Movable Tools	*Let's say I'm done reading, and I can quickly find it... the color schemes are good. It's cool that you can move it. (P3)*
Flexibility	*It's nice that I can add reminders or notes, not just URLs. (P7)*
Adaptability	*I just graduated nurse practitioner school... I would definitely use it [...] to help me find a quicker way to treat my patients. (P3)*
Cognitive and Contextual Support	
Spatial Tasks	*I think that's awesome idea...that you can see which task is specific to what URL. (P4)*
Task Versatility	*I feel like I could use it as a reminder for homework or responsibilities I have to complete. (P5)*
Searching	*I think a lot more helpful to use y'all's idea... because, like I said, if I'm looking for something specific, I normally command F. (P3)*
Overwhelming	*Seeing the tool just outright like this, and looking at it, it was overwhelming. (P4)*

recordings were later transcribed verbatim. The data was analyzed through inductive coding to gain a deeper understanding of participants' perspectives on the tool and to identify their experiences and challenges. First-level codes have been clustered into five groups that can be applied to both features and are presented in Table 1 and Table 2. One author initially coded, validating and discussing the codes with two other authors afterwards. We followed the coding procedure outlined in [26]. Data saturation occurred when no new code emerged in the interview data [12].

3 Interview and Think-Aloud Session Results

Spatial Working Memory-based Task Management. Participants identified several features of the task management tool as highly beneficial for individuals with ADHD (see Table 1). Most users emphasized that the system is easy to use, with praise for its simplicity of the task list and its ability to quickly capture tasks without causing distractions. The task reminders feature received significant positive feedback as well, as it helped users maintain focus and avoid losing track of ongoing activities. They also underlined that the flexibility to incorporate various task types is a valuable aspect of the system, such as reminders, notes, and URLs, along with the tool's potential adaptability to different contexts. Participants' feedback also revealed some areas for improvement. A compact view and reduced visual design were requested to make the interface less overwhelming. Participants suggested enhancements such as task prioritization, improved organization, and multitasking support to improve usability.

Task-based Progress Tracking. The most frequently mentioned aspect by participants (see Table 2) of our study was motivation, with many highlighting how the progress-tracking feature encouraged them to continue their activities, such as reading. Users appreciated seeing numerical indicators, such as percentages or completion bars, as these provided a sense of immediate accomplishment and spurred them to persist in their tasks. One participant mentioned being motivated to continue reading just to see the numbers increase, demonstrating how progress visualization can positively reinforce engagement. Another recurring theme was time management, as cited by participants who valued knowing how far they had progressed in completing a task. Many appreciated that the feature remained visible on the screen, helping them stay on track and improving their productivity. Participants suggested improvements, such as the option to set markers for the entire page rather than always having to adjust flags manually in the beginning.

4 Discussion

Spatial Working Memory Task Management Interaction. Our results highlight the importance of user-centered, participatory design in developing task management tools for individuals with ADHD. Grounding task interaction in spatial working memory, by allowing users to associate tasks with specific locations, appears to offer an intuitive and cognitively supportive structure for task tracking [44], as reported by the participants. Through participatory design in our focus group, we identified the importance of balance between simplicity and flexibility early on. Participants emphasized the need for high customization, including features such as task prioritization, adjustable views, and configurable settings. At the same time, minimizing visual clutter, maintaining a clear feature hierarchy, and offering an intuitive interface were crucial to reducing perceived overload and preventing distraction. Following core usability principles [35, 42], we simplified task creation and search by separating these actions into distinct views. This design decision, aimed at reducing visual noise, was later validated through participants' statements during user evaluations. Additionally, integrating motivational elements, such as visual indicators of open tasks, proved beneficial. These features serve as external prompts sustaining engagement and focus, supporting users' EF.

Progress Tracking Interaction. The inclusion of (reading) task-related progress tracking addresses a particularly critical area for individuals with ADHD. Reading is often cited as a core area of

Table 2: Progress Tracking User Evaluation: Recurrent themes in the interviews and think-aloud sessions.

Theme	Example Quote
Usability and Accessibility	
Color Usability	*Overall, it's good. I like how it is, and I like that you can move it... if it were red, that would be too much for me. (P3)*
Presence and Functionality	*I like how it stays on your screen. That's a big plus. It's nice. (P11)*
Progress Tracking	*The progress bar would help in knowing how much I have completed. (P4)*
Top Feature Preferences	*Progression bar was nice. That was probably my favorite feature. (P11)*
Task Management and Productivity	
Time Management	*Knowing I'm 29% of the way done lets me manage my time better, especially if I step away and return. (P1)*
Real-time Tracking	*The tracking feels smooth, and it's great to see the percentage go up as I scroll. (P7)*
Task Visibility & Productivity	*I like it because I tend to forget what I'm supposed to do… So just being able to have it on my screen… I feel like it's going to help me keep on track and manage my time a lot better. (P12)*
Engagement Challenge	*This whole thing makes me want to... beat this little guy [Progress Bar] [...] I'm like, oh, I gotta read faster. (P3)*
Customizability and Flexibility	
Progress Bar for Full Page	*A button to set markers for the entire page would be easier, rather than dragging the start and end flags manually. (P6)*
Highlighting Focus	*If as, like, when you set those, you can somehow highlight this... in between these two [markers]. (P3)*
Cognitive and Contextual Support	
Motivation	*I like when the numbers are going up. It helped me feel like I'm accomplishing something… it makes me want to continue reading the article just so I could continue having the numbers go up. (P12)*
Reading Progress	*I would like it to start [tracking] here [in the middle of the screen, not screen top] (P3)*

struggle [10], making it especially important to support attention management and task completion in web-based reading scenarios and to demonstrate the possible effects of *FocusUp* in these settings. Motivation and real-time feedback emerged as key factors in designing progress tracking tools for individuals with ADHD. Visual progress indicators, such as our task-based dynamic progress bars, were reported to foster a sense of achievement and continuity. This supports prior research on the effects of immediate positive reinforcement in ADHD populations [32], indicating that continuous feedback loops can help users stay engaged and on task. Our design's task-specific progress tracking was positively received, especially the markers of completion that remain persistently available on-screen. These affordances enhanced users' situational awareness and provided external structure, both of which are critical elements for supporting attentional control. Requests for improved marker placement (e.g., one-click buttons for setting page markers) and simplified controls underscore the need for low-friction interactions. Some participants identified the marker placement as cumbersome and did not understand why they even needed to be modified manually, while the focus group wanted to allow for this, as many pages for reading tasks only have important text in some parts of the page. This clash of requirements highlights again the diversity of the target group and the importance of individualization (particularly effective in the initial setup of the tool) for achieving high acceptance rates for such a system. Participants reported these features helped them manage their time and avoid abandoning tasks in the middle, a common challenge in ADHD self-management. The success of these features further reinforces the design choice to prioritize real-time, visual feedback on actual task progression rather than time spent, thereby aligning the support more closely with how individuals with ADHD engage with tasks.

5 Limitations and Future Work

The primary limitation is that the study focused only on perceived effects by a limited number of participants and did not include performance-based metrics. Conducted in a short-term, task-specific reading context, the evaluation does not capture how *FocusUp* performs in more complex workflows or over extended use, where habits, learning effects, or tool reliance may emerge. Without longitudinal or real-world data, the sustained engagement and long-term effectiveness of these approaches remain uncertain. Future work should investigate the long-term impact and everyday applicability of *FocusUp*, alongside opportunities to weigh task complexities against one another. In-the-wild deployments would offer deeper insight into sustained effects on attention regulation, task completion, and engagement, while capturing the complexity of real-world distractions experienced by individuals with ADHD.

6 Conclusion

In this paper, we introduced *FocusUp*, a web-based tool co-designed with individuals with ADHD to support online task management. The system combines spatial working memory-based task anchoring with task-based progress tracking, offering contextual structure and real-time feedback. Findings from our participatory study suggest that these features help users feel that they reduce distractions, minimize task switching, and provide meaningful scaffolding for users with executive function challenges. The participatory design process grounded development in lived experience, emphasizing simplicity, visual clarity, and unobtrusive integration. Participants valued the system for reducing cognitive friction by embedding tasks directly within the content, rather than requiring context switching.

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A Appendix

A.1 Tool Flow

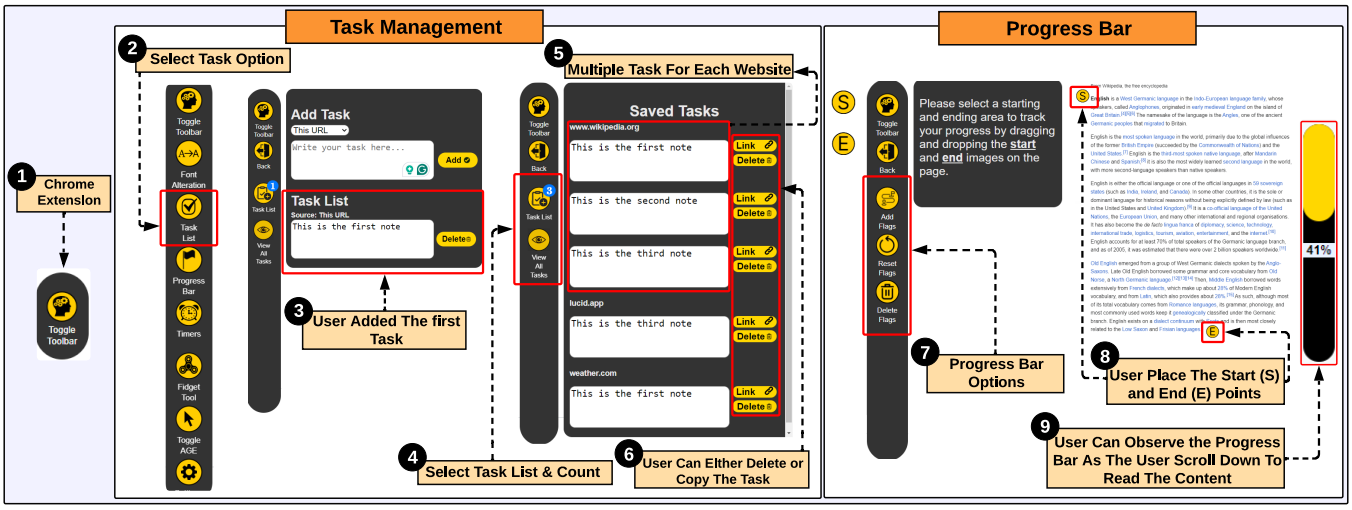


Figure 2: Overview of *FocusUp*'s features and workflows. All steps are described in detail in the following sections. First, we demonstrate task management with web location-based tasks, similar to virtual post-its. Second, the progress bar tracks actual reading progress through start and end markers.

Task Management User Flow as presented in Figure 2:

(1) The *FocusUp* toolbar is initially positioned at the top left of the user's window, and offers drag-and-drop repositionability with persistent location saving via the Chrome storage API. The toolbar, collapsed as default, can be toggled to minimize interface clutter [43]. This unobtrusive approach, particularly relevant for users with ADHD, ensures that toolbar features are accessible yet non-distracting when not in active use.

(2) Upon expansion, the "Task List" button provides access to functionalities for managing tasks, including viewing current website-specific tasks, accessing saved persistent tasks, adding new tasks with definable scope, and deleting existing tasks.

(3) The first functionality within the "Task List Menu" is task creation that includes a *scope dropdown menu* (initially set to "This URL"), a text box for task input, and an "Add" button. **The *scope dropdown menu* allows users to specify the visibility of the task:** (1) 'This URL': restricting the task's appearance to the exact webpage where it was created; (2) 'This Domain': limiting visibility to any page within the website's domain; or (3) 'All Websites': ensuring the task is persistently visible across all browsing activity. Once the user has entered the task details and selected the scope, clicking the "Add" button saves the task in the Chrome storage API.

(4) Users can access the "Saved Tasks Menu" by clicking the "View All Tasks" button. This menu allows users to view all their saved tasks, regardless of their scope, and provides the ability to navigate directly to the websites associated with each task.

(5) The 'Saved Tasks Menu' displays all tasks, organized by associated website domains. To mitigate information overload, lengthy task descriptions are partially collapsed and can be expanded.

(6) In the 'Saved Tasks Menu,' each task can be deleted. Additionally, for individuals with ADHD, remembering where a task originated or navigating back to the correct context can be particularly challenging [13]. To address this challenge, a 'Link' button is provided, which opens a new tab directed to the task's original creation URL.

Progress-Tracking User Flow as presented in Figure 2:

(7) Clicking the Progress Bar (PB) icon displays the PB Menu, which presents 'Add Flags,' 'Reset Flags,' and 'Delete Flags' options. The 'Add Flags' option initiates progress measurement by allowing users to designate Start and End points. This action prompts a pop-up menu, guiding users to position Start and End markers via drag-and-drop. The 'Reset Flags' option, enabling repositioning of the markers, was implemented based on user input to improve usability and reduce user frustration [17].

(8) Users' position Start and End images to define review content. After setup, the extension tracks reading progress. Progress is calculated as a percentage from the Start to the End marker in a dynamic progress bar.

(9) The progress bar consists of three components: a container (black), a progress indicator (yellow), and progress text. These elements, along with Start and End markers, become visible upon clicking the 'Add Flags' icon and persist until the page is reloaded or 'Delete Flags' is selected. The container's dark color contrasts with the progress indicator's yellow, and a white band provides a high-contrast

background for the progress text, enhancing visibility [18]. This design minimizes distractions by hiding progress elements until needed.

A.2 Interview Demographics

Table 3: Demographics of interview participants.

Participant	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12
Formally Diagnosed	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No
Taking ADHD Treatment	No	Yes	Yes	No	No	No	Yes	No	No	Yes	Yes	No
Age	21	38	28	24	26	29	22	22	21	32	24	18
Gender (Male / Female)	M	F	F	F	M	M	M	M	M	F	M	F
Education Level (High School / Bachelor)	H	B	B	B	H	H	H	H	H	H	H	H