# Designing for Night-Time Reflection

## How to Support Night-Time Reflection Through Non-Digital Means

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## ABSTRACT

Self-reflection allows people to communicate with themselves and evaluate their actions and behavior. Engaging in reflection can help professionals improvise in unfamiliar situations by making decisions based on their implicit knowledge and experience [5]. Research on reflection include how to foster a reflective mindset (e.g., William Odon's "Photobox" [3]) and how to support those reflecting (e.g., "Reflection Companion" by Rafal Kocielnik et al.). In this research, we expand on Fleck and Fitzpatrick's framework for designing to support reflection by exploring how their design techniques extend to a night-time (i.e., while settling down to sleep) context. Based on our findings, we develop a list of factors to consider when designing to support night-time reflection and suggest areas for further exploration.

## CCS CONCEPTS

• **Human-centered computing** → Interaction design; Interaction design process and methods; User centered design.

## KEYWORDS

Reflection, reflective HCI

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## 1 INTRODUCTION

Reflection helps people recall and evaluate their actions by stepping out and taking time to communicate deeply with themselves. The importance of reflective behavior is evidenced by works from authors such as Donald Schoñ [5], who illustrates the importance of self-reflection in professional practice. Recently, there has been increasing interest among HCI researchers in establishing frameworks for reflection [1, 2] and supporting/encouraging reflection in other contexts [3, 4].

In their 2014 paper, Eric Baumer et al. compile findings from analyzing a collection of 76 ACM papers focused on the topic of self-reflection. Only 30 of the 76 papers provided explicit definitions of reflection, of which many "consisted of a brief, surface-level description without grounding in extant theory" [1]. The authors of these studies loosely define reflection as a means to "increase self-knowledge" and persuade the practitioner to "take action based on this increased awareness" [1]. Though the multiple references to Schon's framework for reflection in defining reflection could be perceived as a consensus, the authors argue that there exist other conceptualizations of reflection worth considering.

Rowanne Fleck and Geraldine Fitzpatrick provide a possible framework to design for reflection [2]. Through synthesizing literature on reflection, they define reflection through the concept of five "levels of reflection," from R0 to R4. At the lowest level (R0) is "revisiting," in which the person engaging in reflection recalls events or actions. The second lowest form (R1) is "revisiting with explanation," where the reflective person provides descriptive reasons for their actions. Our research primarily focuses on supporting reflection for this level. The higher levels consider relationships between actions (R2), different perspectives (R3), and wider implications such a moral and ethical issues associated with an action (R4). In addition to providing a definition for reflection, Fleck and Fitzpatrick describes techniques to support each level of reflection through technological means. For example, technology can assist revisiting by "providing a record of knowledge, events, [and] experiences" [2].

William Odom's "Photobox" illustrates an example of a technology that invokes the highest form of reflection, where the user reflects not only on their own experience but also on the fast-paced nature of modern society [3]. The initial frustration of not being in control over the printer is self-analyzed and turns to appreciation for slow design.

An example of a technology that supports practical reflection is the "Reflection Companion" by Rafal Kocielnik et al. [4]. Their design encourages reflection on fitness through prompting users with questions and displaying their personal fitness data. In doing


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so, the user engages in R1 reflection, which is appropriate for the short time constraint that participants have in their context.

In this research, we hope to expand on the framework established by Fleck and Fitzpatrick by exploring how their techniques for supporting reflection translate to the context of night-time reflection. Through discussing results from four semi-structured interviews and a 44-participant survey, we describe how techniques to design for reflection should be adapted to better support those preparing to sleep.

## 2 METHODS

To investigate how to support night-time reflection, we conducted four explorative semi-structured interviews and administered an online survey distributed through social media. We developed a list of questions that delved into participant demographics, attitudes toward reflection (e.g., "How important is reflection to you?"), motivations and pain points when reflecting (e.g., "Can you recall a time when you had a positive/negative experience with reflection?"), and technology use while reflecting (e.g., "Have you used any tools to support your reflection?"). Similarly, survey questions probed the emotional experience of night-time reflection in a broader population and how they compare to interview responses. We shared the survey primarily through the University of Washington Reddit community (https://www.reddit.com/r/udub/) and by word-of-mouth and gathered 44 responses over 4 days. We then used affinity analysis and quantitative analysis to generate our findings.

## 3 RESULTS AND DISCUSSION

In this section, we summarize the results of our research and discuss their implications on designing for night-time reflection. Although we did not intentionally scope for age, findings are most relevant to young adults between ages 18-22 which represented 26/44 (or 59%) of survey respondents.

### 3.1 Findings

Analysis of interview and survey data produced the following findings about participants' experiences with night-time reflection.

*3.1.1 Varying attitudes toward technology use in bed.* Many participants (28/43) felt that the use of technology before bed reduces their quality of sleep, yet some relied on their mobile phones to record thoughts from reflection. Most participants found that looking at bright screens distracted from their efforts to go to sleep. Interestingly, some participants turned to digital technology to intentionally avoid reflection as "the less [they] think when trying to sleep, the better."

*3.1.2 Difficult to act upon reflection takeaways.* Some participants felt frustrated when they failed to act upon their reflection takeaways. When asked a question about negative experiences during reflection, one participant replied, "when I don't act upon my reflections. . . I start to feel really disappointed in myself." This sentiment was echoed in survey responses that bemoaned the difficulty of remembering pre-sleep thoughts in the following day. Some felt hesitant to turn to their phones to take notes due to their bright screens potentially inhibiting efforts to sleep.

*3.1.3 Long reflection hinders time to fall asleep.* Time spent reflecting varied between under 15 minutes to up to 2 hours, with most participants reflecting between 15 and 30 minutes. Spending a long time reflecting reduced participants' quality of sleep. When they fell asleep quickly, participants mentioned feeling happier and more relaxed in the following day. The possibility of spending an excessive time reflecting influenced participants to prefer avoiding reflection. In response to the survey question "Can you think of anything that could improve your night-time reflection experience," 7 out of 25 respondents expressed a desire to spend less time on reflection and fall asleep quicker (e.g., "I'd rather be able to turn that part of my mind off and just daydream or fall asleep easier and faster," "[taking] sleeping pills to avoid thinking").

*3.1.4 Triggers of night-time reflection.* Night-time reflective behavior was triggered by a number of factors. Physical and mental fatigue allowed participants to fall asleep quickly. The environment when preparing to sleep, with lights turned off, silence, and isolation, also triggered reflective behavior as people "[didn't] have anything else to do," as one interviewee stated. Failures and anxiety also triggered reflection: academic-related failures and feelings of dread for assignments or tests were common topics of reflection.

### 3.2 Design Techniques

Based on the research findings, we developed a list of design techniques to consider when designing to support night-time reflection.

*3.2.1 Stray from screen-based interactions.* Understanding that interacting with bright screens inhibits efforts to sleep, designs supporting night-time reflection should allow for non-digital, unintrusive interactions. An alternative way to take notes without a smartphone, for example, might be to whisper thoughts to a listening device.

*3.2.2 Support users in acting on their reflection takeaways.* Forgetting takeaways from a past reflection and anxiety to make big changes to their lifestyle were the biggest obstacles that participants faced when trying to act upon their reflection takeaways. Recording thoughts through unintrusive methods as discussed in 3.2.1 can help users recall their previous engagement in reflection. Designs could help alleviate the anxiety people feel when thinking of making big changes to their lifestyle by breaking the ultimate goal (e.g., "stop procrastinating on homework") into smaller subgoals (e.g., "reduce daily time spent on social media by one hour").

*3.2.3 Consider the negative emotions that might come up in night-time reflection.* Compared to daytime reflections, reflections at night tend to be about negative experiences, at times forcing people to stay awake longer than desired. Designs should consider the potentially heavy subjects that people might reflect on and seek to form a more positive and productive relationship with these thoughts. For example, a design could play soothing music when the user engages with it.

## 4 CONCLUSION

Self-reflection provides an opportunity for individuals to communicate with themselves and evaluate their actions. Our research extends techniques provided by Fleck and Fitzpatrick on designing

to support reflection to the night-time context. Based on our findings, technology to support revisiting [2] in night-time reflections should stray from screen-based interactions and help users navigate the negative emotions experienced while reflecting. In addition to extending on the field of designing for reflection, our research raises potential areas of further research. First, how might attitudes toward engaging in night-time reflection vary across different demographics? Second, how could we design product interactions that stimulate the brain less than graphical user interfaces, and how could this research on low-stimulus interaction be extended to the broader field of the design of communication?

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