Design Fiction on Capturing, Amplifying, and Instilling Happiness in Work

Sowmya Somanath
sowmyasomanath@uvic.ca
University of Victoria
Victoria, Canada

Bahare Bakhtiari
baharebakhtiari@uvic.ca
University of Victoria
Victoria, Canada

Regan L. Mandryk
reganmandryk@uvic.ca
University of Victoria
Victoria, Canada

ABSTRACT

Work technologies often emphasize productivity. We suggest a value shift: designing these tools with employee happiness as a central goal. Being happy is a primary life goal for many people. Additionally, happiness positively influences various work-related factors, including productivity, engagement, motivation, and overall accomplishment. Drawing from principles in psychology, we developed three design fictions that illustrate how future work technologies can foster happiness. Informed by our fictions and their analysis, we offer three main takeaways. First, designers can intentionally foster happiness by incorporating happiness-fostering strategies in technology design. Second, we think work technologies have the potential to promote lasting forms of happiness by thwarting or forestalling hedonic adaptation—the tendency to become accustomed to positive experiences. Third, we think such technologies should serve as facilitators, recording experiences, enabling reflection, and guiding individuals toward building and sustaining happiness.

CCS CONCEPTS

• **Human-centered computing** → *Interaction design theory, concepts and paradigms*; *Systems and tools for interaction design.*

KEYWORDS

Designing for Happiness, Work Technologies, Design Fiction

1 INTRODUCTION

Imagine you are working on a project that must be finalized today to meet an important submission deadline. Over the past six months, you have been diligently working on this project, believing that its completion will make you happy. During your work, you utilize a variety of work technologies and companion productivity features such as time management and task tracking apps, focused time schedulers, distraction blocking apps, tools that track progress towards your goals, and platforms for reading interesting articles, watching videos, and for instantly connecting with your networks. By the end of the workday, these technologies have helped you meet the deadline! You feel a sense of pride that the project is in good shape. However, when you pause to assess whether you feel as happy as you had anticipated or happy at all, you realize you are not. What stands out more is the mental and physical exhaustion you are experiencing, and the limited time you have put toward social relationships over the duration of this project.

Would this experience have unfolded differently if the technologies used at work had explicitly fostered happiness instead of merely promoting productivity, efficiency, and proficiency? And would the happiness gained come at a cost to productivity, efficiency, and proficiency? In this paper, we explore these questions theoretically.

Happiness is a complex construct and can be viewed as comprising of four components — positive affect (e.g., joy and contentment), negative effect (e.g., sadness and anger), global life judgement (e.g., life satisfaction and meaning), and domain satisfaction (e.g., satisfaction with work and health) [27]. The weight assigned to these factors vary in different definitions of happiness, but a commonly used definition in the field of psychology equates happiness to increased positive affect, decreased negative affect, and increased satisfaction [25]. Although happiness is not the sole goal in life, research finds that many people across different cultures, contexts, genders, socioeconomic statuses, and ages consider it an important goal for themselves and future generations, often superseding other goals such as a meaningful life, a wealthy life, and a psychologically rich life [46, 72, 73, 110]. Thus, over the past few decades, psychology researchers have begun to unpack and gather empirical evidence regarding these components, and their importance in various contexts (e.g., [102, 110]). Specific to the domain of work, researchers have found that happiness is important because happy people tend to be more productive, engaged, motivated, and sociable (e.g., [33, 47, 60]).

Researchers of HCI and Design, have also shown an interest in learning more about happiness, and have advocated for considering well-being and happiness in technology design (e.g., [16, 23, 44]). They have proposed frameworks [15, 23], design heuristics [77], and demonstrated several examples of technologies that explicitly focus on fostering happiness, human flourishing, and well-being (e.g., [10, 22, 31, 59, 95]). More recently, research in the area of Digital Well-being has highlighted the need to consider people's relationships with work technologies, as they can positively or negatively impact well-being or happiness. (e.g., [45, 51, 86, 88]).

However, the variables for design that are considered in these applications (e.g., abstaining from social media, blocking notifications, and creating focused time) while related to happiness, are not in service of fostering overall happiness (e.g., [33, 35, 73]). For example, while focused time can impact well-being, a person can still not be happy due to poor job quality or their limited interactions with colleagues.

Despite the strong theoretical underpinnings for happiness, the growing empirical evaluations of the determinant factors and fostering strategies for happiness, and the adoption of such concepts in HCI and Design, work technologies have not explicitly focused on happiness as a core value. In this paper, we speculate on a happiness-oriented future for work technologies using the design fiction method [20, 42]. Drawing from the literature in psychology and HCI, we develop three fictional scenarios for an example class of knowledge workers: university professors. In each scenario, we discuss how technologies could be designed to foster happiness using existing happiness fostering strategies such as *savouring* [12, 48] and *adding novelty into everyday experiences* [75, 114]. We evaluate our design fictions using the PERMA model, which consists of five components (positive emotions, engagement, relationships, meaning, and accomplishment), that are posited to help people build happy lives [96]. Based on our fictions and the analysis, we offer three suggestions for future designers. First, we provide guidance on how happiness can be operationalized for technology design, suggesting that designing technologies using happiness fostering strategies offers one practically feasible path for implementation. Second, designers can carefully select features to implement such that fostering lasting happiness is possible. Third, we shed light on possible limitations of happiness fostering technologies that designers should likely consider to in-turn help end-users set better expectations about the impact of the technology.

2 RELATED WORK

Our work draws from two main areas: i) studies on happiness within the domains of psychology and related fields such as organizational research, and ii) research from HCI and Design that has focused on designing and evaluating technology for fostering happiness. We provide a brief summary of literature from these areas and highlight gaps our work will address.

2.1 Happiness Research

2.1.1 Defining and Measuring Happiness. Positive psychology research has focused on understanding and gathering empirical evidence regarding various subjective experiences such as satisfaction, hope, optimism, flow, and happiness (e.g., [99, 102, 110]). Interest in learning about happiness (also interchangeably referred to as subjective well-being) has grown significantly over the last decade (e.g., [46, 99, 103]). Research indicates that genetics and life circumstances influence 50% and 10% of happiness, respectively, while human thoughts and actions can impact the remaining 40% [60]. This possibility of impacting one's happiness has led to a growth in happiness research and has inspired interest as a teaching topic in formal academic environments (e.g., [11, 28, 52, 62, 91, 92, 102]).

Happiness is a complex construct and as such there is variation in how the term is defined (e.g., [74, 100]). In psychology, happiness is commonly defined as encompassing i) high life satisfaction, ii) high positive affect, and iii) low negative affect [25]. In this paper, we use the same definition for happiness. The term is further divided into "eudaimonic", referring to activities done by people that lead to the combination of the three factors (i-iii), and "hedonic", which is happiness based on pleasure and self-indulgence [87, 100]. Researchers in psychology employ empirical assessments to comprehend these forms of happiness and their impact on individuals' lives. These include gathering and analyzing data from self-reporting questionnaires assessing life satisfaction and affect, expert ratings derived from participant interviews, and experience-sampling techniques [26, 49, 71, 74, 96, 101].

In unpacking the construct, the research in happiness has primarily focused on two high-level research directions. The first direction pertains to learning about what makes people happy i.e., identifying determinant factors for happiness. Studies have found that determinant factors such as motivation, productivity, engagement, and wealth contribute to happiness, but individually they are not equal to overall happiness [73, 98, 100]. The majority of happiness research has focused on this direction. The second direction pertains to learning how people can become happy i.e., identifying strategies that can foster happiness. These strategies focus on specific thinking styles and behaviours that impact affect and the cognitive aspects of one's lives, and it is postulated that practicing such strategies can help people and organizations build happiness (e.g., [35, 39, 48, 69, 96]). Examples of such fostering strategies include *savouring*, *injecting novelty into familiar experiences*, and *dodging comparison triggers* (e.g., [12, 34, 60]). Researchers have noted that not all strategies are equally effective. For example, for some strategies—including mindfulness and meditation, and exercising—relatively little empirical evidence supporting their efficacy in fostering happiness has been found [34]; whereas, the efficacy of other strategies can be context dependent (e.g., savouring can be both maladaptive and adaptive [12]).

Informed by the literature on happiness, we make two main research choices. **First**, despite ongoing debates on the importance of hedonic versus eudaimonic happiness (e.g., [87]), we consider both relevant for deriving implications for technology design, as supported by prior research in HCI and UX (see [16, 24, 67, 93, 119]). **Second**, for our design fictions, we use happiness *fostering strategies* to develop the diegetic prototype concepts instead of using happiness *determinants*. We feel that the fostering strategies have a more direct relationship with technologies and can be supported by interaction designers, whereas designing for the determinants will lead to a more narrow focus that is less directly related to the concept of happiness (e.g., a person who is motivated may not be happy).

2.1.2 Happiness at Work. Positive psychology concepts such as happiness, job satisfaction, and motivation have been considered in relation to work contexts (e.g., [4, 6, 33, 80, 90, 113]). Specific to happiness, Fisher provides a comprehensive summary of how happiness has been operationalized and assessed in workplace experiences [33]. Their paper highlights that researchers have typically not directly measured for happiness, as many have focused on understanding related constructs, such as job satisfaction (e.g., [9, 32]). Fisher argues that happiness at work is more than job satisfaction,

and assessments for happiness must happen across several levels including person-level attitudes, collective attitudes, and with respect to the job and the organization. A similar argument is presented by Johnson et al. [47], who further highlight that it is important to note that factors such as job satisfaction and motivation are not the same as happiness—while one may be satisfied with or motivated by their work, the individual can still be unhappy due to reasons such as poor relationships with colleagues. In the domains of psychology, organizational research, and economics, this has led to more awareness for how terminologies are used and has created new research directions such as those pertaining to the design and evaluation of new assessment scales for happiness in work experiences (e.g., [90]).

Irrespective of whether happiness is directly or indirectly measured, several studies have emphasised the importance of understanding and supporting happiness in workplace experiences. For example, at the highest level, researchers have explored whether having a job is even important for happiness. A recent study that accounted for pandemic effects found that those who worked during the pandemic were happier than those who did not, and happiness diminished substantially amongst those who lost jobs during the pandemic [76]. Researchers have also explored how happiness impacts work. Studies have highlighted that there is a positive relationship between a worker's happiness and productivity (e.g., [6, 85]). Similarly, studies show that employees who usually experience low skill variety in their jobs feel significantly happier when they engage in activities that allow them to use various skills [70].

A number of studies also highlight what contributes to making employees not happy. For example, a 2021 survey conducted with 3,200 working scientists from around the world, found that a majority complained about low and stagnant salaries as contributing factors for the lowered optimism they felt towards their careers [118]. Specific to university professors, Chen found that reasons such as pressures to publish, taking on administrative duties, and what they perceived as decreasing quality and learning attitudes of students, reduced job satisfaction [18]. Similarly, researchers find that the lack of learning opportunities and professional development lead to job dissatisfaction amongst teachers [89].

Although the impact of determinants on happiness could vary based on context (e.g., under duress versus a safe environment), studies regarding determinant factors make explicit the general behaviours (such as upward and downward social comparisons, and miswanting) that everyone engages in irrespective of career, education, and context, that can lower felt happiness (e.g., [7, 17, 38, 60]).

From such studies, the main implication for practice is that organizations and employees themselves must think more about how jobs and work can be crafted to increase happiness [41, 70, 107, 108]. Our work contributes to this space by exploring how work-related technologies designed using strategies can foster happiness. Informed by Fisher [33], we analyze our design fictions across different levels using the PERMA model for happiness [96]. For example, using the PERMA model we reflect on individual-level attributes such as positive emotions. Similarly, we also consider collective-level attributes such as the technology's ability to facilitate engagement and relationships

between the primary persona and the other characters in the narrative. In this paper, we did not evaluate at an organization-level as we deemed that out of scope for a theoretical paper such as ours, but consider it a natural future work extension for this line of research.

2.2 Technology for Fostering Happiness

Arguably almost all of HCI is concerned with making life better for end-users in some way, and thus could be considered as (very broadly) aligning with the interests of positive psychology. However, the focus of this section, and our work, is on technologies that **explicitly** focus on addressing happiness in either design and/or assessment.

2.2.1 HCI and Positive Psychology. In this section, we look at four categories of technologies that have explicitly advocated for embedding happiness and happiness-related determinant factors – i) Positive Technologies [84], ii) Hedonic Quality [24, 43, 44], iii) Positive Design [23], and iv) Positive Computing [16].

The goal of *Positive Technology* is "investigating how ICT-based applications and services can be used to foster positive growth of individuals, groups and institutions" [36]. Examples of Positive Technology have typically included tools that intervene and measure health-related well-being (e.g., [10, 31, 78, 109]), and AR/VR technologies for promoting empathy and prosocial behaviours (e.g., [81, 121]).

Hassenzahl et al. introduced the idea of considering *hedonic qualities* such as appeal, excitement, and joy for software products and systems [44]. While Hassenzahl's focus on hedonia is grounded in origins from consumer research and user experience research, the overarching concept is focused on emphasizing psychological well-being needs of end-users. One example of this line of work includes comparing and contrasting hedonic (e.g., aesthetics) and pragmatic qualities (e.g., usability) in interfaces such as shopping websites [106]. Another example is research that aims to unpack long-term impact of hedonic qualities in existing products such as phones [50].

Positive Design is motivated by the idea that "if products function as resources that address meaningful goals, then they can contribute to users' happiness", and thus focuses on designing products that enable, stimulate, and inspire engagement in meaningful activities [23]. Compared to the other concepts, Positive Design is unique in that it suggests a holistic consideration of multiple "ingredients" (albeit with different degrees of focus), which includes pleasure, virtue, and personal significance. For instance, a positive design breakdown for violin would consider how playing it can give people pleasure, learning music skills can provide a sense of fulfilment, and appreciating the music or instrument can result in exercising virtues such as appreciating beauty.

Lastly, similar to the other categories, *Positive Computing* is also interested in the "design and development of technology to support psychological well-being and human potential"([16], pp. 2). Calvo and Peters developed a framework that suggests designing technologies by considering i) determinant factors (such as positive emotions, motivation, and engagement) that come from existing theories of well-being, and ii) different technology goals (such as

redesigning to address or prevent determinants, promoting determinants in existing technologies, and creating new technologies for explicitly promoting such determinants) [15]. Peters has also proposed a set of heuristics that suggest 15 ways to support autonomy, competence, and relatedness, which are considered important user needs for fostering well-being [77]. Similar to Positive Technologies, several examples of Positive Computing have also focused on health and include applications such as technology-enhanced mindfulness interventions for people with dementia [94, 95], and mobile applications for preventing depression amongst working populations [22].

Our work builds on these theories, and extends them by exploring them relative to a specific application domain: technologies for knowledge workers.

2.2.2 Technologies for Workplace Happiness. Some HCI and psychology researchers have investigated designing technologies that can foster happiness in work (e.g., [8, 13, 19, 57, 83, 120]). For example, Ziender et al. proposed 17 "experience categories" that describe reoccurring qualities within positive experiences at workplaces. These include positive experiences such as receiving or giving feedback that are appreciative, solving a problem, experiencing creativity, finishing a task, and connecting with others [120]. Informed by these, Laib et al. [57] conducted a wizard-of-oz study to compare an existing worker guidance system to a redesigned guidance system (presented as an animation), and measured the impact of UX on assembly workers' felt positive and negative emotions. They found participants reported more positive feelings when using the redesigned system, but no mood differences were observed after the assembly task was complete [57]. A similar design approach was taken by Burmester et al., who discussed two prototype ideas—a gratitude expressing button, and a co-working space called project collage—to highlight possibilities for creating positive emotional experiences for sales personnel [13].

Going beyond UX changes, a number of projects have looked at improving digital well-being, which includes aspects related to happiness (such as affect) but more often focuses on improving people's relationship with technology (e.g., see [40, 68, 86]). Within this space, researchers have considered the possibility of automatically or self-capturing employees' well-being information (such as mood, and health data) to assist with improving digital well-being (e.g., [1, 45, 51, 86]). These attempts have led to questions about the autonomy, ethics, and privacy expectations when technology is involved in fostering digital well-being (e.g., [86, 117]). Similarly, researchers have investigated the introduction of interventions as a way to foster digital well-being. The primary idea behind these projects is often to test how technologies can be used to scale digital well-being practices. Examples of such interventions have included protecting time for focused work [88] or limiting email checking [56]. However, some studies have found limited or no benefits from such interventions. For example, Przybylski et al. conducted experiments with undergraduate students from the USA, UK, and Hong Kong to learn about the impact of 1-day digital detox on happiness. Overall, they found no reliable effects on overall positive mood, negative effect, or satisfaction within that day, while some participants reported feeling slightly worse on the day they abstained [79].

Our work does not explicitly focus on improving people's relationship with technologies (e.g., blocking social media apps to avoid distraction); instead we discuss how technology can scaffold or facilitate experiences that lead to moments and long-term experiences of i) high satisfaction, ii) high positive affect, and iii) low negative affect [25].

2.3 Summary

Overall, from our literature review, we identify two main gaps that require future research consideration:

Theoretically, while concepts such as *Positive Design* and *Positive Computing* offer deep insights towards how the domains of HCI and positive psychology can intersect, these concepts are context independent. This means that although they are helpful as a starting point of consideration, they offer limited guidance for how a specific class of technologies can be designed—e.g., how might design bring together considerations for pleasure, virtue, and personal significance when it comes to work? How do we balance the need for getting work done (e.g., productivity and performance) while also fostering and sustaining worker happiness?

Technologies that have been proposed for digital well-being could be co-opted but must be extended to foster happiness. Newer designs for happiness will have to look beyond the narrow slice of work intervention tools such as regulating checking emails, managing calendars, or blocking access to distractions. Similarly, while well-being-related data capturing technologies such as smartwatches can be useful for reflecting on and fostering happiness, not all determinants and behaviours that foster or undermine happiness are easy to capture (e.g., overthinking) and thus such tools likely only present a partial and narrow view of felt happiness.

3 DESIGN FICTION

3.1 Methodology

Design fiction is a method used to reflect on future technologies (referred to as diegetic prototypes) by placing them within a fictional world, wherein interactions can take place [20, 42]. We use the same approach to create 3 fictions and within each describe how personas interact with the fictional technology. The prototypes can take varied forms ranging from textual descriptions, sketches, multimedia artifacts, to functional systems [42]. In our paper, we use a combination of textual descriptions and sketches to describe the scenario and the prototypes within. Similarly, the approaches to evaluate design fictions—and in turn the prototypes embedded within them—have also been varied in HCI [5]. Baumer et al. suggest that a grounding principle for assessing design fictions should be to consider their epistemic value (i.e., what knowledge are we gaining from the design fiction?), instead of debating the usability aspects of the produced prototypes [5]. In this paper, we take a similar stance. In our analysis of the design fictions, we address our overarching questions of technology's ability to foster happiness and their impact on employee's work experiences (e.g., engagement, motivation, and accomplishment), guided by the PERMA model for happiness [96].

3.2 Fiction Universe

We are interested in investigating what an ecosystem of work technologies that are designed from the perspective of fostering happiness could look like (recall the scenario we described in the Introduction). In this section, we outline the three core reasons that motivated us to consider the happiness-oriented work technologies future:

First, is a **motivation to meet fundamental human needs**—Across cultures, countries, economic classes, generations, and life circumstances, people select being happy in their life as more important than other options, such as a meaningful life or a psychologically rich life filled with novelty and variety [72]. This expectation of (and desire for) happiness extends to all aspects of our life, including our work. As a result, a workplace and the technologies within it that focus on *happiness* as the primary goal is an ideology that a majority of people can align with. This happiness ideology makes the experience of work inherently more *human-centered*, even if happiness in itself was a means to no work-specific end.

Second is a **motivation to counter the misplaced belief in supporting moving targets**—Work technologies have often focused on improving factors such as productivity, engagement, motivation, and accomplishment (e.g., [86, 88]). Such an approach likely stems from the fact that these are also the metrics of assessment for work. However, rarely can individuals or groups agree on the importance of, value of, or extent we should go to achieve these factors—how productive, how much engagement, or how collegial an individual or environment should be is often debatable (e.g., [51, 86]). Further, these criteria are often moving targets and employees and employers find themselves in a constant race to 'up the game'. For example, we can design a multitude of features that prevent distraction at work, such as social media blockers, or offer focused work scheduling, to further productivity. It may be desirable for reasons such as gaining salary increments, recognition awards, or simply as a response to peer pressure, that we could continuously increase the number of blocks of time that are allocated for focused hours in the hopes of creating more productive workdays. However, if such decisions come at the cost of missing out on serendipitous interactions with colleagues, and opportunities that may uplift our mood, then the same productivity tool would likely drive the person to burnout, thereby creating newer and bigger problems than it solves. Additionally, the moving target of what is considered productive enough for meritorious evaluation suggests that we end up constantly 'scaling up' our productivity, which has precipitated a number of human-centered crises in knowledge work in general (e.g., [37, 54, 65]).

Third, is a **motivation that our fiction universe represents a feasible future to implement**—A search on the Internet will reveal that happiness has been used as a catch-all term to include everything from self help to building social media cultures (e.g., toxic positivity). However, outside of the happiness fad, is serious intellectual research, wherein researchers from psychology and relevant domains, have spent over two decades describing the construct, developing objective measurements for it, and evaluating models, theories, interventions, and strategies. This happiness research has influenced organizations that directly affect citizens, including governments (e.g., see Wellbeing Economy Governments [2])

and the UN (see, UN Sustainable Development Goals) [46]. Technology researchers have also adopted these concepts and applied them. However, as discussed in related work, when it comes to work technologies, many solutions tend to revert back to focusing on individual and narrow aspects of determinant factors of happiness, and not designing for the strategies that are known to foster happiness.

In the design fictions, we describe ways we envision this future could play out, and later describe how such technologies can(not) foster happiness.

3.3 Persona

For our design fiction, we draw from and extend Sal—the persona described by Mark Weiser in the paper "Computer of the 21st century" [112]. In our fiction, Sal has made the decision to move from industry to academia and is now an assistant research professor, pre-tenure, and works at a public research university in North America. Sal's area of research is human-computer interaction, and she is part of the computer science department. Sal's job as an academic has three main components—teaching, research, and service. Sal has adopted the ubiquitous technological environment and uses several technologies for accomplishing her work including platforms for literature search, email, messaging apps, office tools, and data trackers. Her tool usage is driven by a desire to improve productivity—e.g., always-on messaging apps so she can offer help to her students as quickly as possible, various literature search tools so she can learn about research topics, office tools for improving efficiency, and data trackers to learn about and optimize how she spends her work time.

Sal is generally a positive person, with no diagnosed health conditions, and lives in a safe city. She can set reasonable expectations from self and others, and has small but a strong social network consisting of family and friends. Sal aims to lead a healthy lifestyle and exercises regularly, and often engages in hobbies outside of work. Sal's subjective happiness rating measured using the *authentic happiness scale* [97, 101] varies over the academic year, with the score being medium to high during occasions when she is learning from the ongoing research projects, her students achieve awards or recognition, her interactions with her colleagues and students are collegial, and research publications and grant applications are accepted. Sal's self-rated happiness scores often decreases when she is overwhelmed with teaching-related tasks, and is stressed about research progress, and raising funds to support her research group.

Overall, Sal can be considered a so-called "average" end-user. Although Sal has no major contextual realities impacting her life (e.g., war, threats to safety, poverty, or severe health conditions), she can still struggle with being happy. Her push for productivity does not lead to life satisfaction, or improvement in affect overall.

Our choice of focusing on knowledge workers is primarily a pragmatic choice. Many commercially available work and digital well-being technologies such as Slack, Teams, and focus and time management apps, are designed for knowledge workers (e.g., [40, 68, 115]). Our choice of university professors was motivated by our familiarity with this group. Additionally, media posts [30, 53, 65, 82] and research (e.g., [3, 18, 58, 89] shows that professors are

only moderately happy in their careers, and experience high stress, high burnout, decreased motivation, and decreasing job satisfaction when compared to industry researchers, making them a valid end-user group for our design work.

3.4 Design Fictions

In the following sections, we describe three design fictions that present diegetic prototypes that aim to foster happiness. Our fictions are not exhaustive. We start with routine activities performed by research professors in North American universities — graduate supervision, publishing, serving on departmental committees, and writing administrative reports. Although classroom teaching is a major task for most professors, we did not include it in our current set of fictions because we think that its complexity (e.g., complex interdependence between students, teaching assistants, university administrators, student offices, and the instructor) requires a more dedicated focus.

To design our diegetic prototypes we selected three *happiness fostering strategies* — savouring, adding novelty into familiar experiences, and dodging comparison triggers) [35, 60]. Two of the authors iteratively discussed and refined the design fictions, and we considered how these fit our chosen work activities. To evaluate the design fictions, we use the PERMA model [96]. If happiness is considered the outcome, then predictors of happiness are inputs for the strategies [63, 100]. Thus, in our work, we considered the happiness elements of the PERMA model (e.g., engagement, relationships, meaning, accomplishment, and positive emotions) as inputs and evaluated (to the extend possible without a user study) if our diegetic prototypes offer meaningful ways to provide these inputs. For example, to engage in the strategy of *savouring* people must be able to gather data that they can later reflect upon, and so we evaluated how and to what extent that is possible. We further elaborate on our use of the PERMA model in section 7.

4 FICTION 1: SAVOURING

4.1 Strategy

Savouring is the act of stepping out of an experience to review and appreciate it [12, 48]. Savouring facilitated by methods such as memory building and sharing with others is found to help amplify an individual's subjective well-being [12]. In this narrative (Figure 1), we use savouring as a strategy to inform the design of a system, Ha-P, that can help foster happiness in a research publication process.

4.2 Interactions with Ha-P

Sal meets her new MSc student, Jill, to discuss potential project ideas. Jill shares that she recently saw the e-textile garment launch by Adobe and was very excited about the possibilities in that space. As the conversation flows, they begin to doodle some ideas for dynamic e-textile clothing, and find themselves enjoying the conversation as they deliberate the future. Sal realizes she had booked them for a one-hour meeting, and so they decide to wrap up. To capture this fun meeting, Sal uses this new app, Ha-P, she has recently downloaded for documenting research processes. Jill does not have the app, so Sal shares it with her by bringing her phone in close contact with Jill's phone. Sal creates a shared project with Jill and

shares that too. Sal then takes photos of the images they had doodled and adds them to Ha-P. Both Jill and Sal add some quick notes, they write casually, also using emoticons. Ha-P asks them how happy they are feeling in that moment, considering their affect and the cognitive aspects of the work, and they both select a number between 1-5.

Two weeks pass since the meeting, and Jill has read some papers about related topics. Using Ha-P, she has documented her favorite papers by taking pictures of the prototypes within them, and highlighting some important sections of the paper. After each reading session, Jill has been updating her happiness score in that moment. Sal's been getting these updates and likes a few of the updates. The app also prompts Sal to add her happiness score every time she interacts with it, but she ignores most of these prompts as she has been liking these updates from Jill as a quick response and not when she has the time to process the updates or her own happiness. At the end of the week, she goes back to look at Jill's update more closely, and is able to add some notes of her own in response to Jill's reading summaries. She is feeling happy that her student is engaged, and thus responds to the happiness score prompt this time around.

One day as Jill was reading another paper, she experiences this moment where she thinks she knows how to approach her project— she wants to run a study to understand perspectives of fashion designers! Very excited about having reached this point, she captures a photo of that moment using Ha-P and annotates it with notes. As always, Ha-P asks her about her happiness score in that moment, and Jill selects a number between 1-5. Sal sees this update on Ha-P and sends Jill a quick message about how excited she is to chat more on Monday!

They meet on Monday and are excited about the prospect of working with professional textile designers but find themselves struggling to identify a clear research question for the study. They have made some notes on a digital whiteboard throughout this meeting and send these notes to Ha-P for Jill to reflect on later. At the end of the meeting, each of them note that their self-rated happiness score was quite low that day. They end the meeting with a plan to read some more literature and to do some more thinking over the next two weeks.

As Jill spends more time going through the literature, she finds herself feeling overwhelmed, and doesn't add anything to Ha-P for over two weeks. Sal, on the other hand, has had a very busy week and adds a note on Ha-P that she hasn't unfortunately done anything related to this project, along with her happiness score, which is low. Realizing that she hasn't seen any updates on Ha-P from Jill, Sal worries if Jill is doing fine. She sends a quick message to Jill to check on her and they decide to meet later to talk over a walk.

They meet again after two weeks, and Sal notes that one day ago, Jill had posted an update about her revised study plans and was seemingly sounding happy again, and her self-rated happiness score was high again. Motivated to keep Jill's happiness high, Sal decides to offer feedback with more care. During the meeting, Sal finds that the second draft has some good starting points for potential research questions but the protocol needs further refining. They spend time working on the protocol together on the whiteboard, and the end of the meeting update Ha-P with their scores. This
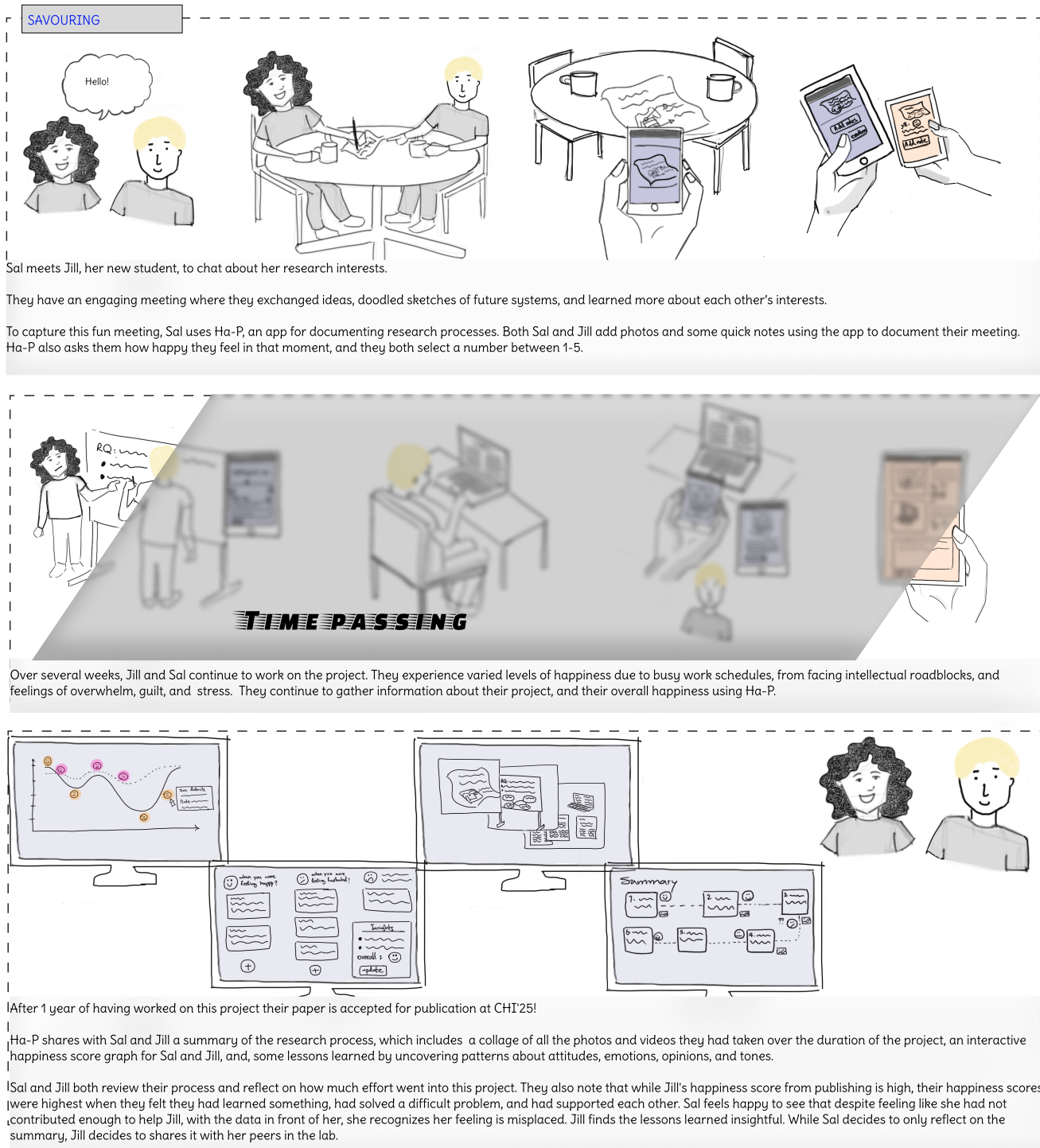
SAVOURING

Sal meets Jill, her new student, to chat about her research interests.

They have an engaging meeting where they exchanged ideas, doodled sketches of future systems, and learned more about each other's interests.

To capture this fun meeting, Sal uses Ha-P, an app for documenting research processes. Both Sal and Jill add photos and some quick notes using the app to document their meeting. Ha-P also asks them how happy they feel in that moment, and they both select a number between 1-5.

Over several weeks, Jill and Sal continue to work on the project. They experience varied levels of happiness due to busy work schedules, from facing intellectual roadblocks, and feelings of overwhelm, guilt, and stress. They continue to gather information about their project, and their overall happiness using Ha-P.

After 1 year of having worked on this project their paper is accepted for publication at CHI'25!

Ha-P shares with Sal and Jill a summary of the research process, which includes a collage of all the photos and videos they had taken over the duration of the project, an interactive happiness score graph for Sal and Jill, and, some lessons learned by uncovering patterns about attitudes, emotions, opinions, and tones.

Sal and Jill both review their process and reflect on how much effort went into this project. They also note that while Jill's happiness score from publishing is high, their happiness scores were highest when they felt they had learned something, had solved a difficult problem, and had supported each other. Sal feels happy to see that despite feeling like she had not contributed enough to help Jill, with the data in front of her, she recognizes her feeling is misplaced. Jill finds the lessons learned insightful. While Sal decides to only reflect on the summary, Jill decides to shares it with her peers in the lab.

Figure 1: A storyboard visualizing design fiction 1: savouring.

repeats 5 more times, with both of them reporting varying levels of happiness over time.

Finally, after 5 rounds of revising the study plan, Sal and Jill are happy about the study protocol version they have narrowed down on. Jill is feeling excited about this project again and thinks about

how much fun it will be to start conducting the interviews. Sal and Jill capture this meeting by taking a picture of them smiling to capture the joy they are both feeling and Jill adds it as an update on Ha-P.

The above described pattern of capturing research experiences using photos, videos, and self-rated happiness scores is continued by Jill and Sal over the various research phases. Jill and Sal receive a message after 1 year of having started this project that their paper was accepted for publication at CHI'25! Jill is happy as this is her first paper! Sal is also happy about the publication but has very little time to reflect on this happiness as she has four other deadlines that day, which needs her attention. Jill updates Ha-P with a picture of her paper noting how happy she feels but also notes that she had anticipated feeling much happier. Sal who sees this update replies back, "feel that way every time!" Jill marks that the first project milestone is now complete using Ha-P.

Based on the milestone update, Ha-P assembles a summary of the 1-year process. This includes (1) a collage of all the photos and videos taken over the duration of this project, (2) an interactive happiness score graph for Sal and Jill, with some notes about times where the data is sparse, and (3) utilizing the programmed sentiment classification techniques, generates a list of potential lessons learned by uncovering patterns about attitude, emotion, opinion, and tone (e.g., Ha-P highlights that overall Jill seems to have enjoyed data analysis). Ha-P sends a notification to Jill and Sal that their summary is ready for review and also highlights an option to share this generated summary.

Sal and Jill both review their process and reflect on how much effort went into this project. They also note that while Jill's happiness score from publishing is high, their happiness scores were highest when they felt they had learned something, had solved a difficult problem, and had supported each other. Sal feels happy to see that despite feeling like she had not contributed enough to help Jill, with the data in front of her, she recognizes her feeling is misplaced. Jill finds the lessons learned insightful since she hadn't considered some of them to be true (she really hadn't liked the narrowing down of the study but apparently she had overall??) and also finds funny some of the less relevant summaries the algorithm has provided her (e.g., telling her that coffee drinking made her sad). While Sal decides to only reflect on the summary (she has 4 more such summaries from her other students), Jill thinks sharing it with her peers can be beneficial for them to see the research process and thus, shares it with the lab.

5 FICTION 2: ADDING NOVELTY INTO FAMILIAR EXPERIENCES

5.1 Strategy

Hedonic adaptation refers to a process wherein people grow accustomed to a repetitive positive or negative stimulus (e.g., circumstances or events) [61]. Such an adaption has implications on how happiness is experienced. For example, an adaption may require thwarting (e.g., if people are enjoying their work, then it may be desired to sustain that feeling), or activating or accelerating that adaption (e.g., if a person needs to adjust to noise from construction). An approach to thwarting hedonic adaption is to add an element of novelty to renew people's interest in that experience or activity

(e.g., [75, 114]). In this narrative (Figure 2), we use injecting a novel experience as a strategy to inform the design of a system, Ha-P, that can help foster happiness in a reviewing task.

5.2 Interactions with Ha-P

Sal is part of the faculty recruitment committee for the first time this year. She has to go through 20 applications to identify her shortlisted top 4 candidates. For each applicant, Sal is required to complete a descriptive rubric that assesses the candidates for their contributions to research, teaching, and service. Sal has been notified that these rubrics must be completed by 3 weeks.

Sal divides up the pile into 5 groups based on topics closest to her interest to those further from her expertise, and decides to complete reading the applications over 4 sessions. During each reading session, she reads an entire application first and then fills out the rubric for that corresponding candidate. Sal has been reading these applications during the weekend as she had had limited time during the week because of other ongoing teaching and service commitments. At the end of each session, Ha-P prompts her to assess and enter her happiness score on a scale of 1-5.

From her first session to the second, she finds a small dip in her felt happiness score from 4 to 3.5. She notes that while she has very much enjoyed learning about the candidates, the administrative task of filling out the rubrics, and having had limited time to spend her weekends doing non-work things have likely contributed to her lowered scores.

Ha-P noting this dip in score and informed by similar data patterns, during the third reading sessions suggests that Sal can mark important pieces of information in the PDF and Ha-P will automatically map the content to the rubric sections. Sal having tried this feature previously knows that it has some problems—the automatic mapping does not always work well. Thus she ignores the automatic fill suggestion and continues to manually complete the rubrics. However, at the end of the task, Sal finds that her reported happiness score (2) is much lower than her last two sessions. She adds a note that while she is interested in helping her department, her motivation is starting to lower knowing that perhaps her hard work will amount to nothing if the hiring is unsuccessful.

In her last reading session, Ha-P noting the previous low happiness score and the gap significantly widening from the first session to the third, no longer offers access to the text-based rubric and has taken over the rubric filling task. While Sal finds this annoying at the start of the session, with no choice, continues her work by marking up the important parts of the application as she reads it.

At the end of each reading, she finds that the automatic filling is not as bad as she had imagined, and had spent most of her time reading and she could edit the rubric much faster than having to fill it out herself from scratch. She finds that with this approach, her assessments had after all not been different, as the stronger applications had ultimately stood out, irrespective of how the rubric had been filled.

By the end of the session, she feels good about the app's takeover and finds it even a little funny that the app has an anthropomorphic quality akin to a slightly overbearing but helpful character. This change in mood also makes her feel optimistic that her work could

ADDING NOVELTY INTO FAMILIAR EXPERIENCES

Sal is part of the faculty recruitment committee and has to go through 20 applications to identify her shortlist of top 4 candidates. For each applicant, Sal is required to complete a descriptive rubric that assesses the candidates for their contributions to research, teaching, and service. These rubrics must be completed by 3 weeks.

Sal divides up the pile into 5 groups based on topics closest to her interest, and decides to complete reading the applications over 4 sessions.
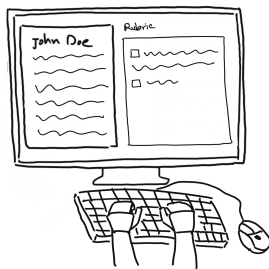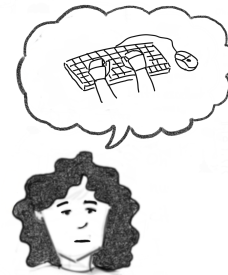
During each reading session, she reads an entire application first and then fills out the rubric for that corresponding candidate. At the end of each session, Ha-P prompts her to assess and enter her happiness score on a scale of 1-5.

From her first session to the second, she finds a small dip in her happiness score (4 to 3.5). She notes that while she has very much enjoyed learning about the candidates, the administrative task of filling out the rubrics, and having had limited time to enjoy non-work things has likely contributed to her lowered scores.
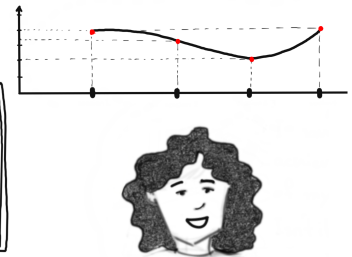
Over time, Ha-P notices further drop in scores and suggests that Sal can mark important pieces of information in the PDF and Ha-P can automatically map the content to the rubric sections. Sal having tried this feature previously knows that it has some problems. Thus, she ignores the suggestion and continues to fill out the rubrics herself. However, at the end of the task, Sal finds that her reported happiness score (2) is much lower than her previous sessions.

In her last reading session, Ha-P seeing the score dip further and the gap significantly widening from the first session to the third, no longer offers access to the text-based rubric and has taken over the rubric filling task. While Sal finds this annoying at the start of the session, with no choice, continues her work.

At the end of each reading, she finds that the automatic filling is not as bad as she had imagined, and had actually spent more time reading. By the end of the session, she feels her mood uplifted and her happiness score is high!

Figure 2: A storyboard visualizing design fiction 2: adding novelty into familiar experiences.

serve as a meaningful contribution towards helping the department.
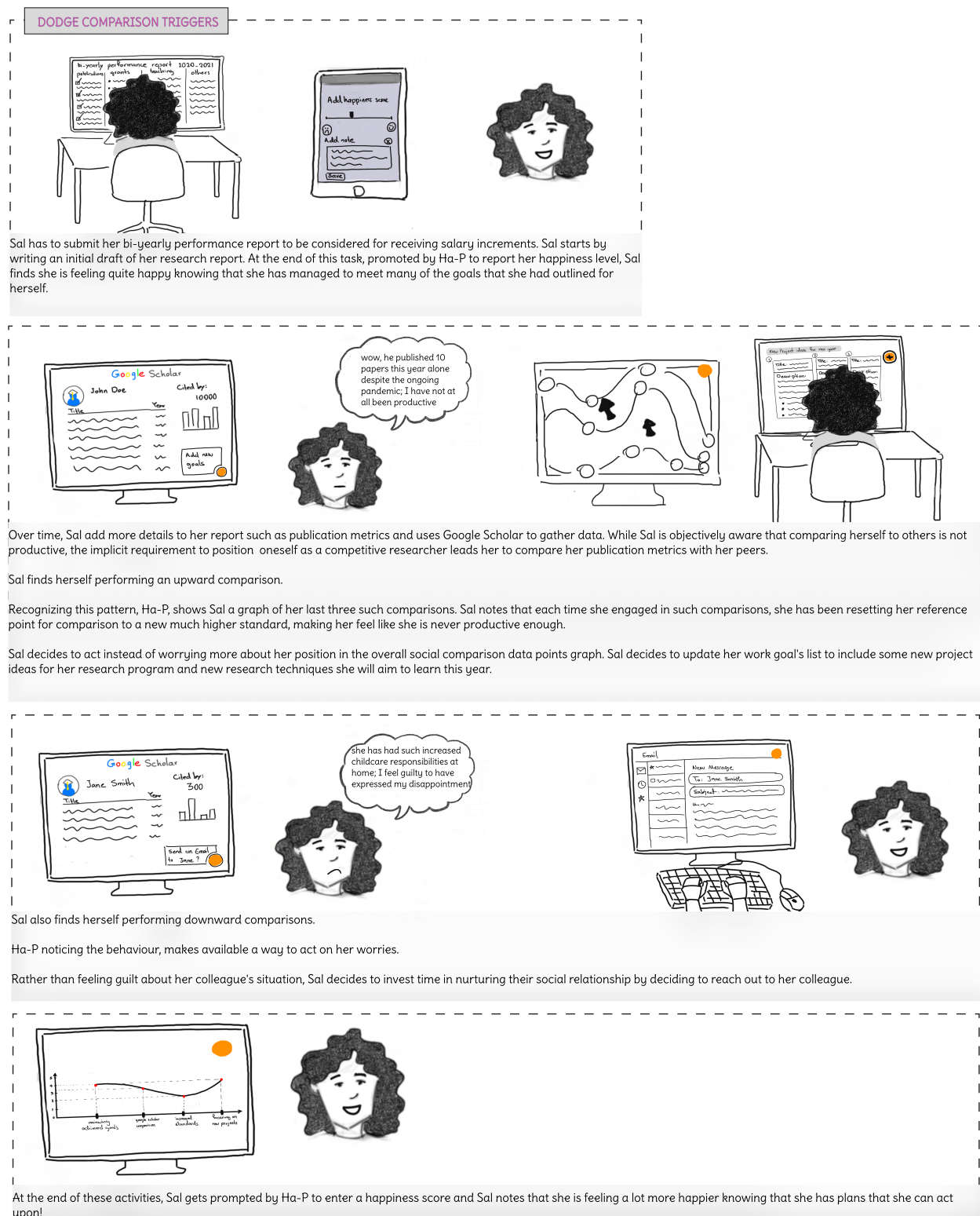By the end of the session she marks her happiness score to be 4.

Sal has to submit her bi-yearly performance report to be considered for receiving salary increments. Sal starts by writing an initial draft of her research report. At the end of this task, promoted by Ha-P to report her happiness level, Sal finds she is feeling quite happy knowing that she has managed to meet many of the goals that she had outlined for herself.

Over time, Sal add more details to her report such as publication metrics and uses Google Scholar to gather data. While Sal is objectively aware that comparing herself to others is not productive, the implicit requirement to position oneself as a competitive researcher leads her to compare her publication metrics with her peers.

Sal finds herself performing an upward comparison.

Recognizing this pattern, Ha-P, shows Sal a graph of her last three such comparisons. Sal notes that each time she engaged in such comparisons, she has been resetting her reference point for comparison to a new much higher standard, making her feel like she is never productive enough.

Sal decides to act instead of worrying more about her position in the overall social comparison data points graph. Sal decides to update her work goal's list to include some new project ideas for her research program and new research techniques she will aim to learn this year.

Sal also finds herself performing downward comparisons.

Ha-P noticing the behaviour, makes available a way to act on her worries.

Rather than feeling guilt about her colleague's situation, Sal decides to invest time in nurturing their social relationship by deciding to reach out to her colleague.

At the end of these activities, Sal gets prompted by Ha-P to enter a happiness score and Sal notes that she is feeling a lot more happier knowing that she has plans that she can act upon!

Figure 3: A storyboard visualizing design fiction 3: dodging comparison triggers.

6 FICTION 3: DODGE COMPARISON TRIGGERS

6.1 Strategy

Research has shown that both upward (e.g., "she has more publications than me") and downward (e.g., "he is unwell") social comparisons impact happiness (e.g., [14, 66, 104, 111, 116]). While the effect of the direction of comparison on people's happiness can vary (e.g., "she has more publications than me" can make some people feel inspired and others envious), considering the manner of its use can be a productive way to foster happiness [64]. A strategy for reducing negative impacts from social comparison is dodging comparison-caused overthinking triggers by strengthening one's identify and working towards building self-worth ([60], chapter 4). In this narrative (Figure 3), we use dodging comparison triggers as a strategy to inform the design of a system, Ha-P, that can help foster happiness in an accomplishment documentation task.

6.2 Interactions with Ha-P

Sal needs to submit her bi-yearly performance report to be considered for receiving salary increments. Salary increments are provided based on relative ranking of people within similar group levels of experience, and thus completing the task implicitly promotes social comparisons with peers.

To develop her salary materials, Sal selects to start by putting together her research report. Sal first writes up an initial draft of her research report summarizing her last two years of work including her publications, grants, and other scholarly achievements. At the end of this task, promoted by Ha-P to report her happiness level, Sal finds herself feeling quite happy knowing that she has managed to meet many of the goals that she had outlined for herself previously.

In the next round of editing her report, Sal begins to add more details such as publication metrics and uses Google Scholar to gather data. While Sal is objectively aware that comparing herself to others is not productive, the implicit requirement to position oneself as a competitive researcher leads her to compare her publication metrics with her peers.

Sal begins to perform both upward (talking to herself, she says "wow she published 10 papers this year alone despite the ongoing pandemic challenges; I have not at all been productive") and downward comparisons ("she has had such increased childcare responsibilities at home; I feel guilty to have expressed my disappointment") and begins to ruminate.

Recognizing this pattern, Ha-P, inserts a dynamically updating graph of the data points Sal has been referencing today as a pop-up in the Google Scholar page. Ha-P also shows her the graphs from her last 3 such comparison instances. Lastly, Ha-P, makes available an editable section that highlights Sal's goal's.

This external pop-up triggered from Ha-P helps Sal stop herself from overthinking. Instead it prompts her to act instead of ruminating for long. From looking at the graph, Sal notes that each time she engaged in such comparisons, she has been resetting her reference point for comparison to a new much higher standard, making her feel like she is never productive enough.

Looking at the graph and her own goals list, Sal decides to act instead of spending more time worrying about her position in the overall social comparison data points graph. Looking through the profiles of people in the higher range of the comparison graph, Sal decides to update her goals list to include some new project ideas for her research program and writes down 2 new research techniques she will aim to learn this year. Rather than feeling guilt about her colleague's situation, Sal decides to invest time in nurturing their social relationship by writing down to reach out to her colleague and to check if she can offer any social support. At the end of this activity, Sal gets prompted by Ha-P to enter a happiness score and Sal notes that she is feeling a lot more happier knowing that she has plans that she can act upon!

7 DESIGN FICTION ANALYSIS

To assess our design fictions, we use the PERMA model, encompassing 5 components (positive emotions, engagement, relationships, meaning, and accomplishment), which taken together are said to foster human flourishing or happiness [98]. These elements—while not exhaustive and sometimes overlapping (e.g., someone who is engaged likely also accomplishes more)—are empirically validated and used across several contexts, including for work [55], making them a useful set to consider for assessing happiness fostering strategies [96]. Our choice for using the PERMA model for analysis is two-fold: first, the model considers how happiness can be built [96]. Thus, when applied to technology design, it creates an opportunity for designers to ask "how might we...?" questions regarding technology's role in facilitating or scaffolding happiness. Second, the PERMA model in relation to other well-being models offers strong psychometrics correlation [39], thus making it likely an empirically sound option to deploy in future user studies for assessing technologies. Next, we discuss each component of the PERMA model in relation to our design fictions, highlighting how *Ha-P* can(not) help Sal build her happiness.

7.1 Positive Emotion: *How does the technology increase or decrease affect?*

Emotions influence our actions in the world (such as how productive we are at work). In the PERMA model, this component is about increasing positive emotions. To address this aspect, the PERMA model suggests considering strategies, such as savouring, that can foster happiness. In our fictions, Ha-P is designed using happiness fostering strategies as the main driving principle. Depending on the choice of strategy, the increase in positive emotion can be about a past (e.g., narrative 1), present (e.g., narrative 3), or future event (e.g., narrative 2). For example, in narrative 1, looking back on the research process via the happiness graphs, sentiment analysis text summaries, and pictures collages, we see Sal and Jill express feeling positive emotions.

7.2 Engagement: *How does the technology support engagement?*

Engagement in the PERMA model refers to involvement, attachment, and level of inclination towards activities such as work. Engagement can be attained by experiencing *flow*, wherein people find themselves fully absorbed in the task at hand [21]. The technology in our design fictions scaffolds or facilitates Sal's engagement in three different ways. First, in narrative 1, the technology serves

primarily as scaffolding mechanism. Using the recording capacity of Ha-P Sal can capture information about her engagement in a task (e.g., an engaging meeting can be captured using photos, notes, and emoticons) and view this information in the future to reflect on what contributed to experiencing involvement, attachment, and inclination. The application also helps capturing information in team settings as shown in narrative 1, wherein both Sal and Jill collect and share information about their level of engagement with each other, thus enabling group reflection. Second, in narrative 2, the technology helps Sal stay engaged in a task. Despite Sal's reluctance to adopt a different workflow, the app eventually forces her to take an alternative pathway (e.g., replacing manual rubric filling with automatic filling) to accomplish the task by dynamically replacing one functionality with another, which enables her to spend more time reading instead of constantly context switching between reading and making notes. Third, in narrative 3, the technology helps Sal re-engage in the task when she starts to drift away or disengage from the main activity by showing her information that is presumably more relevant to her.

7.3 Relationships: *How does the technology contribute to relationships with others?*

Relationship refers to our connections with others. Our capacity for building networks by showing love, compassion, kindness, empathy, teamwork, or cooperation, are found to be important for improving our happiness [55]. Ha-P's role in supporting Sal's relationship with her student and colleagues happens in an implicit manner. In contrast to tools such as social media or dating apps, wherein the applications explicitly encourage people to add others to their network and like or comment to engage with their connections, the technology in our fiction helps Sal view information about her connections (e.g., watch her student's update, or check the publication data of other people), but assumes that the actual work of building relationships will happen outside the realm of technology. For example, in narrative 1, Sal strives to show care noting that her student's happiness scores have been low. Similarly in narrative 3, Sal makes a note to reach out to her colleague when she finds herself engaging in downward social comparisons.

7.4 Meaning: *How does the technology evoke a sense of meaning and purpose?*

Meaning refers to going beyond self by serving a community or accomplishing goals that serves more than the individual. In our design fictions, we see Sal is engaged in tasks that are meaningful such as supervision, or helping her department by serving on a committee, but deriving a sense of meaning from them can be difficult while such activities are in progress. In such scenarios, technologies can facilitate happiness by making it easier to access relevant information that sheds light on one's contribution towards goals that serve more than them. For example, in narrative 1 we see Sal as a helpful person who cares for her student, but her busy schedule makes her feel like her help is inadequate. The summary presented at the end of the research process we find helps her see that perhaps her assumptions were misguided and she had after all been able to help her student in substantial ways. Similarly, in narrative 2, technology's intervention highlights to Sal that while

outputs for a process may look different and may only be good-enough and not perfect, the act of going through the process and completing the task by staying engaged can lead to making meaningful contributions. And in narrative 3, we see Sal reframing her research outputs not as the end product itself (i.e., the publication as the goal), but in service of a higher purpose (i.e., as evidence of learning a new research skill) that connects directly with her work goals and purpose.

7.5 Accomplishment: *How does the technology help people pursue accomplishments?*

Accomplishment includes aspects such as people pursing competence, success, or mastery of skills, irrespective of whether it leads to positive emotions, meaning, or relationships. In our fictions, this is facilitated in two ways. First by helping Sal complete a task and thus enabling success with lower-level tasks (e.g., as seen in narrative 2). Second, by offering history keeping which enables recognizing and reflecting on accomplishments such as success or learned skills. For example, in narrative 1, we see Jill is able to see an overview of the effort involved in bringing a project from idea conception to publication and reflect on how she achieved success (here successful publication). In narrative 3, we see Sal reflecting positively on her accomplishments over the last few years and updating her goals to reflect her next pursuit at work, setting a trajectory for the next pursuit of accomplishment.

8 DISCUSSION

In this paper, we set out to address two overarching questions: 1) *how might we design technologies for work that explicitly focus on fostering happiness?* and 2) *would the happiness gained come at a cost to productivity, efficiency, and proficiency?*. Our literature review highlighted that technologies can be designed using the happiness lens, and that happy people are typically more productive, engaged, accomplished and more. However, to design work technologies for fostering happiness, there is a need for extending the theoretical concepts from areas like Positive Computing, and Positive Design, and presenting new work technology examples that are different from those typically presented in areas like Digital Well-being. Informed by our design fictions and their analysis, in this section, we present three high-level novel considerations for work technology design that offers a starting point for fostering happiness.

8.1 Operationalizing Happiness

To build systems that foster happiness, we must deconstruct happiness into operationalizable units (i.e., aspects we can design for and assess). As discussed in our related work, there are a number of ways to operationalize happiness. For example, by designing for individual or combination of determinant factors like engagement and motivation [15], or by taking a more holistic approach wherein multiple determinants (i.e., virtue, pleasure, and personal signficance) must be addressed but perhaps not to the same degree [23]. **The idea that we advance here is that happiness fostering strategies can be used for designing future work technologies**. Two reasons motivate our suggestion.

First, addressing individual determinant factors (e.g., motivation)—although a valid approach to addressing happiness—runs the risk

that the construct is broken down into too small a piece and therefore, misses the more holistic way people derive happiness from their work [33]. If we design and evaluate for improving determinant factors (e.g., motivation), we would likely address pain points in people's life (e.g., fixing problems with the parts of the work they do not like) but it would not mean that the global outcome would be that they are happy or more happy than before. To address this risk, a combination of factors could be selected as done by Desmet and Pohlemeyer [23], but picking a combination of individual factors is also a complicated problem as individual factors have varying degrees of correlations and causal relationships with overall happiness [73, 96]. In contrast, researchers have outlined some approaches for determining the best strategies to implement, for example, using methods such as the *person-activity fit diagnostic* [60].

Second, if we define happiness per Diener's definition, encompassing affect and satisfaction [25, 26], then strategies for fostering happiness can be a useful starting point as they are designed to address both the affective and cognitive aspects of happiness. A latest study by Folk and Dunn, provides some evidence for this idea [35]. For example, at an individual level, injecting novelty into familiar experiences has been found to have led to better moods, decreases in negative affect, and greater satisfaction. Similarly, organization and government implemented strategies, such as providing financial support as an attempt to raise the happiness of disadvantaged populations, have been found to improve affect and life satisfaction.

Despite our outlined potential benefits for operationalizing technology design using happiness fostering strategies, we also anticipate some challenges. One challenge we anticipate with our approach is that designing technologies using strategies likely will result in relatively complex systems. As demonstrated in our design fictions, each scenario includes a system that consists of multiple features. For implementation, this challenge could be addressed to some extent by co-opting some existing system features. For example, "focus" is a feature available in Apple products that blocks notifications for specific duration of time. This feature combined with a feature that suggests tasks that require more social interactions could be one way to implement the strategy of *being more sociable*, which is found to positively impact affect [29]. Similarly, a number of simple to complex features exist for capturing and detecting moods and emotions, which can be leveraged by technologies that foster happiness. Another challenge is assessment—i.e., are we measuring the experience the combined features offer or the impact of individual features? and which combination of features is more helpful? To address the former question, we think it is more important to assess aspects such as whether users and designers recognize the implications of the strategies on their overall happiness [23, 105]. To address the latter concern, multiple studies would have to be conducted to develop a framework that suggests meaningful combinations of features (very similar to the work undertaken to develop the PERMA model) but the starting step is individual studies that propose and test combination of technology features.

8.2 Fostering Lasting Happiness

The hedonic adaption model or the HAPNE model "posits that adaptation proceeds via two separate paths, such that initial well-being gains or drops corresponding to a positive or negative life change (e.g., relationship start-up vs. break-up) are eroded over time.", and the rate at which such "eroding" happens can vary widely and impact happiness [61]. For example, some people's happiness may drop rapidly after performing repetitive tasks. However, Lyubomirsky suggests that people do have the capacity to control the speed and extent of such adaptions via intentional activities [61]. For example, newer experiences could help the person find those same repetitive tasks engaging and meaningful again, thus bringing up their happiness. Building on this, **we suggest that technologies can scaffold or facilitate activities that offer some control over adaption**.

In our narratives, we showed many strategies that can offer control over hedonic adaption. For example, in narrative 1 preserving aspects of a positive experience enables adaption-forestalling. In narrative 2, explicitly injecting novelty in a familiar and repetitive experience helps thwart hedonic adaption. Lastly, in narrative 3, bringing back attention to important aspects such as goals and personal growth can both thwart and forestall adaption. Literature points to many more options that future designers could consider (e.g., [61]).

Arguably, control over adaption afforded by a technology is not a requirement. People themselves could find alternative ways to thwart or forestall hedonic adaption. However, people are generally unaware of their psychological immune system, and thus technologies could help (e.g., [38]). In the context of work especially, technology can help—it can be difficult for people to recognize alternative ways of accomplishing the same task. In such cases, leveraging options such as AI and ML to train algorithms that can analyze the scope of technological possibilities for a given software or product (similar to generative design algorithms), and suggest feasible alternative workflows, is more within the realm of what system designers are better positioned to consider.

8.3 Technology's Role as a Facilitator for Fostering Happiness

Informed by our analysis (section 4), we think that the primary role that technology can play for fostering happiness is that of a facilitator—i.e., the technology can guide the person through the process of practicing a happiness fostering strategy. Similar to a human facilitator, a system that fosters happiness at work can **record, enable reflection, and guide**. For example, the system can help with creating self awareness, by helping the person record their happiness score and other relevant information over time relative to their tasks. Such recording of data must be owned by the employee themselves, and the system should offer appropriate levels of control and autonomy. By performing varied types of analysis, the system can summarize relevant information often and enable reflection. Lastly, the system can recognize common triggers that cause one's happiness to decrease in work contexts and suggest alternative paths to take to improve felt happiness. When necessary, the guidance can be more firm than a suggestion, to keep the practice of building happiness going.

In basing the technology's role as a facilitator, we think certain expectations regarding user behaviour need to be tempered. A system that is designed to guide, cannot be expected to guarantee long-term behaviour change. For example, we do not think Sal's use of the diegetic prototypes over time will make her a permanently happy person. People's behaviour and thinking styles do not contribute to 100% of felt happiness (Lyubomirsky suggests 40% is influenced by behaviour [60]). Additionally, despite easy access to knowledge about what makes people happy, individuals tend to continue to miswant [38], and as such, happiness can be viewed as a lifelong learning process. Technology can facilitate such lifelong learning and likely increase happiness within limit, and enable people to be more aware and reflective of their own happiness and that of others around them.

The use of technologies to enduringly increase happiness is likely also out of the scope of what technologies can offer. Attempting to enduringly reach very high-levels of happiness may not be a desirable goal based on context [73]. For example, having a system that only assigns tasks based on high happiness scores will in-turn negatively impact happiness for reasons such as low task and skill variety [70]. Instead, a more productive approach that technologies can explore is providing optimal variability in happiness [73]. For example, it could be beneficial for employees to not constantly increase their expectations for collegiality or availability of colleagues time. In those cases, offering more opportunities for savouring, to help people appreciate what they have could promote more sociable behaviours, and foster happiness.

8.4 Limitations and Future Work

Proposals formulated using design fictions as a method—although well suited for advancing knowledge via speculations grounded in the realities of today, and knowledge from literature—require further evaluation. Thus, a near-term future work is to implement the proposed scenarios and to gather empirical evidence.

Although our suggestions for technology design are likely to broadly hold true for different types of work contexts, we recognize that university professors as an example of knowledge workers are somewhat unique in that these jobs already embed several aspects that favour the happiness determinants (e.g., meaning, engagement, motivation), and thus we anticipate further nuancing will be required for other types of knowledge workers and workplace environments.

Lastly, more work must take place to advance knowledge on translating fostering strategies to technology design. This includes identifying appropriate strategies [63], evaluating them with the intended audience, and exploring which existing technologies and features can be co-opted and what new features must be designed to foster happiness.

9 CONCLUSION

We argued for designing work technologies that focus on fostering happiness. Drawing from the domains of psychology, organizational research, and HCI, we identified that although workplaces and employees can benefit from considering happiness as a design goal, the implemented outcomes have typically been quite limited (e.g., applications that foster focus by blocking social media access).

Additionally, while frameworks for considering happiness in the design of technologies have been proposed, they do not explicitly focus on the work context. Informed by these gaps, we presented a design fiction that outlines the work context of a university professor, and proposes three fictional scenarios and within each scenario, diegetic prototypes that aim to foster happiness. We analyzed the fictions using the PERMA model of happiness, and informed by our analysis, offer three considerations for designing future work technologies that foster happiness. First, we suggest that designers can consider designing technologies by using happiness fostering strategies as the guiding principles. Second, we propose that technologies can foster lasting happiness, and suggest that designers can explore ways to thwart and/or forestall happiness. Third, we recommend that the main role of technologies that foster happiness should be that of a facilitator, and that in this role, technologies can explore how to offer varied optimal levels of happiness based on the context of work.

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REFERENCES

[1] Daniel A Adler, Emily Tseng, Khatiya C Moon, John Q Young, John M Kane, Emanuel Moss, David C Mohr, and Tanzeem Choudhury. 2022. Burnout and the Quantified Workplace: Tensions around Personal Sensing Interventions for Stress in Resident Physicians. *Proceedings of the ACM on Human-computer Interaction* 6, CSCW2 (2022), 1–48.

[2] Wellbeing Economy Alliance. 2024. https://weall.org/

[3] Rashid Aziz, Sharif Mustaffa, Narina A Samah, and Rosman Yusof. 2014. Personality and happiness among academicians in Malaysia. *Procedia-Social and Behavioral Sciences* 116 (2014), 4209–4212.

[4] Erica Baranski, Casey Lindberg, Brian Gilligan, Julia M Fisher, Kelli Canada, Judith Heerwagen, Kevin Kampschroer, Esther Sternberg, and Matthias R Mehl. 2023. Personality, workstation type, task focus, and happiness in the workplace. *Journal of Research in Personality* 103 (2023), 104337.

[5] Eric PS Baumer, Mark Blythe, and Theresa Jean Tanenbaum. 2020. Evaluating design fiction: The right tool for the job. In *Proceedings of the 2020 ACM Designing Interactive Systems Conference.* ACM, Eindhoven, Netherlands, 1901–1913.

[6] Clement S Bellet, Jan-Emmanuel De Neve, and George Ward. 2024. Does employee happiness have an impact on productivity? *Management science* 70, 3 (2024), 1656–1679.

[7] Christopher J Boyce, Gordon DA Brown, and Simon C Moore. 2010. Money and happiness: Rank of income, not income, affects life satisfaction. *Psychological science* 21, 4 (2010), 471–475.

[8] Stephen Brewster, Andrew Kun, Andreas Riener, and Orit Shaer. 2021. Human-Computer Interaction to Support Work and Wellbeing in Mobile Environments (Dagstuhl Seminar 21232). In *Dagstuhl Reports*. Schloss Dagstuhl-Leibniz-Zentrum für Informatik, Dagstuhl Publishing, Germany, 22–53.

[9] Arthur P Brief. 1998. *Attitudes in and around organizations.* Vol. 9. Sage.

[10] Eleonora Brivio, Fulvio Gaudioso, Ilaria Vergine, Cassandra Rosa Mirizzi, Claudio Reina, Anna Stellari, and Carlo Galimberti. 2018. Preventing technostress through positive technology. *Frontiers in psychology* 9 (2018), 2569.

[11] Arthur Brooks. 2024. Managing Happiness. https://pll.harvard.edu/course/managing-happiness

[12] Fred B Bryant. 2021. Current progress and future directions for theory and research on savoring. *Frontiers in psychology* 12 (2021), 771698.

[13] Michael Burmester, Katharina Maria Zeiner, Magdalena Laib, C Hermosa Perrino, and Marie-Luise Queßeleit. 2015. Experience Design and Positive Design as an alternative to classical human factors approaches. In *INTERACT 2015 Adjunct Proceedings.* University of Bamberg Press, Bamberg, 153–160.

[14] Bram P Buunk, Frans L Oldersma, and Carsten KW De Dreu. 2001. Enhancing satisfaction through downward comparison: The role of relational discontent and individual differences in social comparison orientation. *Journal of experimental social psychology* 37, 6 (2001), 452–467.

[15] Rafael A. Calvo and Dorian Peters. 2014. *A Framework and Methods for Positive Computing.* MIT press, 81–106.

[16] Rafael A Calvo and Dorian Peters. 2014. *Positive computing: technology for wellbeing and human potential.* MIT press.

[17] Joseph Chancellor and Sonja Lyubomirsky. 2014. *Money for happiness: The hedonic benefits of thrift.* Springer.

[18] Chi Yuan Chen. 2023. Are professors satisfied with their jobs? The factors that influence professors' job satisfaction. *SAGE Open* 13, 3 (2023), 21582440231181515.

[19] CHIWORK Collective, Naveena Karusala, Nabil Al Nahin Ch, Diana Tosca, Alberta A Ansah, Emeline Brulé, Nadia Fereydooni, Le-En Huang, Azra Ismail, Pranjal Jain, et al. 2022. Human-Computer Interaction and the Future of Work. In *CHI Conference on Human Factors in Computing Systems Extended Abstracts.* ACM, New Orleans, USA, 1–3.

[20] Paul Coulton, Joseph Lindley, Miriam Sturdee, and Michael Stead. 2017. Design fiction as world building. In *Proceedings of the 3nd Biennial Research Through Design Conference.* Research through Design, Edinburgh, UK, 1–16.

[21] Mihaly Csikszentmihalyi, Reed Larson, et al. 2014. *Flow and the foundations of positive psychology.* Vol. 10. Springer.

[22] Mark Deady, Daniel AJ Collins, Nicholas Glozier, Evangeline Gardiner, Andrew Arena, Aimee Gayed, Richard Bryant, Rafael A Calvo, and Samuel B Harvey. 2024. Naturalistic evaluation of HeadGear: A smartphone app to reduce depressive symptoms in workers. *Behavior Therapy* (2024).

[23] Pieter MA Desmet and Anna E Pohlmeyer. 2013. Positive design: An introduction to design for subjective well-being. *International journal of design* 7, 3 (2013).

[24] Sarah Diefenbach, Nina Kolb, and Marc Hassenzahl. 2014. The'hedonic'in human-computer interaction: history, contributions, and future research directions. In *Proceedings of the 2014 conference on Designing interactive systems.* 305–314.

[25] Ed Diener. 1984. Subjective well-being. *Psychological bulletin* 95, 3 (1984), 542.

[26] Ed Diener. 1994. Assessing subjective well-being: Progress and opportunities. *Social indicators research* 31 (1994), 103–157.

[27] Ed Diener, Christie Napa Scollon, and Richard E Lucas. 2009. The evolving concept of subjective well-being: The multifaceted nature of happiness. *Assessing well-being: The collected works of Ed Diener* (2009), 67–100.

[28] Elizabeth Dunn and Michael Norton. 2014. *Happy money: The science of happier spending.* Simon and Schuster.

[29] Ryan J Dwyer, Aaron X Zhuo, and Elizabeth W Dunn. 2023. Why do people turn to smartphones during social interactions? *Journal of Experimental Social Psychology* 109 (2023), 104506.

[30] Editorial. 2021. Industry scores higher than academia for job satisfaction. *Nature* 600 (2021). https://doi.org/10.1038/d41586-021-03567-3

[31] Angel Enrique, Juana Bretón-López, Guadalupe Molinari, Pablo Roca, Ginés Llorca, Verónica Guillén, Fernando Fernández-Aranda, Rosa M Baños, and Cristina Botella. 2018. Implementation of a positive technology application in patients with eating disorders: a pilot randomized control trial. *Frontiers in Psychology* 9 (2018), 934.

[32] Cynthia D Fisher. 2000. Mood and emotions while working: missing pieces of job satisfaction? *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior* 21, 2 (2000), 185–202.

[33] Cynthia D Fisher. 2010. Happiness at work. *International journal of management reviews* 12, 4 (2010), 384–412.

[34] Dunigan Folk and Elizabeth Dunn. 2023. A systematic review of the strength of evidence for the most commonly recommended happiness strategies in mainstream media. *Nature Human Behaviour* 7, 10 (2023), 1697–1707.

[35] Dunigan Folk and Elizabeth Dunn. 2024. How Can People Become Happier? A Systematic Review of Preregistered Experiments. *Annual Review of Psychology* 75, 1 (2024), 467–493. https://doi.org/10.1146/annurev-psych-022423-030818 arXiv:https://doi.org/10.1146/annurev-psych-022423-030818 PMID: 37566759.

[36] Andrea Gaggioli, Daniela Villani, Silvia Serino, Rosa Banos, and Cristina Botella. 2019. Positive technology: Designing e-experiences for positive change. , 1571 pages.

[37] Gallup. 2023. State of the Global Workplace 2023 Report. https://www.gallup.com/workplace/349484/state-of-the-global-workplace.aspx

[38] Daniel T Gilbert and Timothy D Wilson. 2000. Miswanting: Some problems in the forecasting of future affective states. (2000).

[39] Fallon R Goodman, David J Disabato, Todd B Kashdan, and Scott Barry Kauffman. 2018. Measuring well-being: A comparison of subjective well-being and PERMA. *The Journal of Positive Psychology* 13, 4 (2018), 321–332.

[40] Google. 2024. Digital Wellbeing. https://wellbeing.google/

[41] Heather J Gordon, Evangelia Demerouti, Pascale M Le Blanc, Arnold B Bakker, Tanja Bipp, and Marc AMT Verhagen. 2018. Individual job redesign: Job crafting interventions in healthcare. *Journal of Vocational Behavior* 104 (2018), 98–114.

[42] Simon Grand and Martin Wiedmer. 2010. Design fiction: a method toolbox for design research in a complex world. (2010).

[43] Marc Hassenzahl, Sarah Diefenbach, and Anja Göritz. 2010. Needs, affect, and interactive products–Facets of user experience. *Interacting with computers* 22, 5 (2010), 353–362.

[44] Mare Hassenzahl, Axel Platz, Michael Burmester, and Katrin Lehner. 2000. Hedonic and ergonomic quality aspects determine a software's appeal. In *Proceedings of the SIGCHI conference on Human factors in computing systems.* ACM, The Hague, Amsterdam, 201–208.

[45] Päivi Heikkilä, Anita Honka, and Eija Kaasinen. 2018. Quantified factory worker: designing a worker feedback dashboard. In *Proceedings of the 10th nordic conference on Human-computer interaction.* 515–523.

[46] John F Helliwell, Richard Layard, and Jeffrey D Sachs. 2023. The Happiness Agenda: The Next 10 Years. *World Happiness Report* 2023 (2023), 15.

[47] Sheena Johnson, Ivan Robertson, and Cary L. Cooper. 2018. *Measuring Well-Being and Workplace Factors.* Springer International Publishing, Cham, 57–70. https://doi.org/10.1007/978-3-319-62548-5_5

[48] Paul E Jose, Bee T Lim, and Fred B Bryant. 2012. Does savoring increase happiness? A daily diary study. *The Journal of Positive Psychology* 7, 3 (2012), 176–187.

[49] Daniel Kahneman and Alan B Krueger. 2006. Developments in the measurement of subjective well-being. *Journal of Economic perspectives* 20, 1 (2006), 3–24.

[50] Evangelos Karapanos, John Zimmerman, Jodi Forlizzi, and Jean-Bernard Martens. 2009. User experience over time: an initial framework. In *Proceedings of the SIGCHI conference on human factors in computing systems.* 729–738.

[51] Anna Kawakami, Shreya Chowdhary, Shamsi T Iqbal, Q Vera Liao, Alexandra Olteanu, Jina Suh, and Koustuv Saha. 2023. Sensing Wellbeing in the Workplace, Why and For Whom? Envisioning Impacts with Organizational Stakeholders. *Proceedings of the ACM on Human-Computer Interaction (CSCW)* (2023).

[52] Dacher Keltner and Emiliana Simon-Thomas. 2024. The Science of Happiness. https://www.edx.org/learn/happiness/university-of-california-berkeley-the-science-of-happiness

[53] David Kroll. 2013. Top 10 Reasons Being A University Professor Is A Stressful Job. https://www.forbes.com/sites/davidkroll/2013/01/05/top-10-reasons-being-a-university-professor-is-a-stressful-job/?sh=747a5aae71c1

[54] Jaroslava Kubátová. 2019. Does Academic Publishing Lead to Work-Related Stress or Happiness? *Publications* 7, 4 (2019), 66.

[55] Ágota Kun, Péter Balogh, and Katalin Gerákné Krasz. 2017. Development of the work-related well-being questionnaire based on Seligman's PERMA model. *Periodica Polytechnica Social and Management Sciences* 25, 1 (2017), 56–63.

[56] Kostadin Kushlev and Elizabeth W Dunn. 2015. Checking email less frequently reduces stress. *Computers in Human Behavior* 43 (2015), 220–228.

[57] Magdalena Laib, Christina Haspel, Christopher Stockinger, Lucas Polanski-Schräder, Philipp Dücker, Kristian Voll, Patrizia Schiffrer, and Michael Burmester. 2022. Wellbeing at Work—Emotional Impact on Workers Using a Worker Guidance System Designed for Positive User Experience. *Multimodal Technologies and Interaction* 6, 10 (2022), 87.

[58] Shiri Lavy and Shira Bocker. 2018. A path to teacher happiness? A sense of meaning affects teacher–student relationships, which affect job satisfaction. *Journal of Happiness Studies* 19 (2018), 1485–1503.

[59] Jingjin Li, Nayeon Kwon, Huong Pham, Ryun Shim, and Gilly Leshed. 2023. Co-designing Magic Machines for Everyday Mindfulness with Practitioners. In *Proceedings of the 2023 ACM Designing Interactive Systems Conference.* 1630–1647.

[60] Sonja Lyubomirsky. 2008. *The how of happiness: A scientific approach to getting the life you want.* penguin.

[61] Sonja Lyubomirsky. 2010. *Chapter 11: hedonic adaptation to positive and negative experiences.* Oxford University Press New York.

[62] Sonja Lyubomirsky. 2014. *The myths of happiness: What should make you happy, but doesn't, what shouldn't make you happy, but does.* Penguin.

[63] Sonja Lyubomirsky and Kristin Layous. 2013. How do simple positive activities increase well-being? *Current directions in psychological science* 22, 1 (2013), 57–62.

[64] Sonja Lyubomirsky and Lee Ross. 1997. Hedonic consequences of social comparison: a contrast of happy and unhappy people. *Journal of personality and social psychology* 73, 6 (1997), 1141.

[65] Stephanie Marken and Sangeeta Agrawal. 2022. K-12 Workers Have Highest Burnout Rate in U.S. https://news.gallup.com/poll/393500/workers-highest-burnout-rate.aspx

[66] Victoria Husted Medvec, Scott F Madey, and Thomas Gilovich. 1995. When less is more: counterfactual thinking and satisfaction among Olympic medalists. *Journal of personality and social psychology* 69, 4 (1995), 603.

[67] Elisa D Mekler and Kasper Hornbæk. 2016. Momentary pleasure or lasting meaning? Distinguishing eudaimonic and hedonic user experiences. In *Proceedings of the 2016 chi conference on human factors in computing systems.* 4509–4520.

[68] Meta. 2024. Well-being Tools. https://about.meta.com/actions/safety/topics/safety-basics/tools/wellbeing

[69] Carey K Morewedge, Daniel T Gilbert, Kristian Ove R Myrseth, Karim S Kassam, and Timothy D Wilson. 2010. Consuming experience: Why affective forecasters overestimate comparative value. *Journal of Experimental Social Psychology* 46, 6 (2010), 986–992.

[70] Wido GM Oerlemans and Arnold B Bakker. 2018. Motivating job characteristics and happiness at work: A multilevel perspective. *Journal of applied psychology* 103, 11 (2018), 1230.

[71] University of Pennsylvania. 2024. Questionnaire Center. https://www.authentichappiness.sas.upenn.edu/testcenter

[72] Shigehiro Oishi, Hyewon Choi, Minkyung Koo, Iolanda Galinha, Keiko Ishii, Asuka Komiya, Maike Luhmann, Christie Scollon, Ji-eun Shin, Hwaryung Lee, et al. 2020. Happiness, meaning, and psychological richness. *Affective Science* 1 (2020), 107–115.

[73] Shigehiro Oishi, Ed Diener, and Richard E Lucas. 2007. The optimum level of well-being: Can people be too happy? *Perspectives on psychological science* 2, 4 (2007), 346–360.

[74] Shigehiro Oishi, Ed Diener, and Richard E. Lucas. 2021. Subjective Well-Being: The Science of Happiness and Life Satisfaction. In *The Oxford Handbook of Positive Psychology*. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199396511.013.14 arXiv:https://academic.oup.com/book/0/chapter/290614754/chapter-ag-pdf/44522325/book_34277_section_290614754.ag.pdf

[75] Ed O'Brien and Robert W Smith. 2019. Unconventional consumption methods and enjoying things consumed: Recapturing the "first-time" experience. *Personality and Social Psychology Bulletin* 45, 1 (2019), 67–80.

[76] Yunmi Park and Tae-Hyoung Tommy Gim. 2024. Who remained happy despite the pandemic?: the impact of changed life situations and mobility and perceptions and attitudes toward the altered lifestyle during COVID-19. *Journal of Asian Architecture and Building Engineering* (2024), 1–15.

[77] Dorian Peters. 2023. Wellbeing supportive design–research-based guidelines for supporting psychological wellbeing in user experience. *International Journal of Human–Computer Interaction* 39, 14 (2023), 2965–2977.

[78] Marlou Poppelaars, Aniek Wols, Anna Lichtwarck-Aschoff, and Isabela Granic. 2018. Explicit mental health messaging promotes serious video game selection in youth with elevated mental health symptoms. *Frontiers in psychology* 9 (2018), 1837.

[79] Andrew K Przybylski, Thuy-vy T Nguyen, Wilbert Law, and Netta Weinstein. 2021. Does taking a short break from social media have a positive effect on well-being? Evidence from three preregistered field experiments. *Journal of Technology in Behavioral Science* 6 (2021), 507–514.

[80] Alfa Santoso Budiwidjojo Putra, Evi Dewi Kusumawati, and Dewi Kartikasari. 2024. Unpacking the Roots and Impact of Workplace Well-being: A Literature Review. *International Journal of Multidisciplinary Approach Research and Science* 2, 01 (2024), 312–321.

[81] Annamaria Recupero, Stefano Triberti, Camilla Modesti, and Alessandra Talamo. 2018. Mixed reality for cross-cultural integration: using positive technology to share experiences and promote communication. *Frontiers in psychology* 9 (2018), 1223.

[82] 2024 Trend Report. 2024. Higher education is struggling. Psychologists are navigating its uncertain future. https://www.apa.org/monitor/2024/01/trends-higher-education-challenges

[83] Simon Riches, Lawson Taylor, Priyanga Jeyarajaguru, Wim Veling, and Lucia Valmaggia. 2023. Virtual reality and immersive technologies to promote workplace wellbeing: a systematic review. *Journal of Mental Health* (2023), 1–21.

[84] Giuseppe Riva, Rosa M Baños, Cristina Botella, Brenda K Wiederhold, and Andrea Gaggioli. 2012. Positive technology: using interactive technologies to promote positive functioning. *Cyberpsychology, Behavior, and Social Networking* 15, 2 (2012), 69–77.

[85] Ivan T Robertson, Cary L Cooper, and Sheena Johnson. 2011. *Well-being: Productivity and happiness at work*. Vol. 3. Springer.

[86] Alberto Monge Roffarello and Luigi De Russis. 2023. Achieving digital wellbeing through digital self-control tools: A systematic review and meta-analysis. *ACM Transactions on Computer-Human Interaction* 30, 4 (2023), 1–66.

[87] Richard M Ryan and Edward L Deci. 2001. On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual review of psychology* 52, 1 (2001), 141–166.

[88] Koustuv Saha and Shamsi T Iqbal. 2023. Focus Time for Wellbeing and Work Engagement of Information Workers. In *Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems*. 1–11.

[89] Zafarullah Sahito and Pertti Vaisanen. 2017. Factors affecting job satisfaction of teacher educators: Empirical evidence from the Universities of Sindh Province of Pakistan. *Journal of Teacher Education and Educators* 6, 1 (2017), 5–30.

[90] Andrés Salas-Vallina and Joaquín Alegre. 2021. Happiness at work: Developing a shorter measure. *Journal of Management & Organization* 27, 3 (2021), 460–480.

[91] Laurie Santos. 2024. The Happiness Lab. https://www.pushkin.fm/podcasts/the-happiness-lab-with-dr-laurie-santos

[92] Laurie Santos. 2024. The Science of Well-Being. https://www.coursera.org/learn/the-science-of-well-being

[93] Katie Seaborn, Peter Pennefather, and Deborah I Fels. 2020. Eudaimonia and hedonia in the design and evaluation of a cooperative game for psychosocial well-being. *Human–Computer Interaction* 35, 4 (2020), 289–337.

[94] Cassandra EL Seah, Sijin Sun, Zheyuan Zhang, Talya Porat, Andrew Waterhouse, and Rafael A Calvo. 2022. Using a User Centered Design Approach to Design Mindfulness Conversational Agent for Persons with Dementia and their Caregivers. In *Adjunct Proceedings of the 2022 ACM International Joint Conference on Pervasive and Ubiquitous Computing and the 2022 ACM International Symposium on Wearable Computers*. 207–210.

[95] Cassandra EL Seah, Zheyuan Zhang, Sijin Sun, Esther Wiskerke, Sarah Daniels, Talya Porat, and Rafael A Calvo. 2022. Designing Mindfulness Conversational Agents for People With Early-Stage Dementia and Their Caregivers: Thematic Analysis of Expert and User Perspectives. *JMIR aging* 5, 4 (2022), e40360.

[96] Martin Seligman. 2018. PERMA and the building blocks of well-being. *The journal of positive psychology* 13, 4 (2018), 333–335.

[97] Martin EP Seligman. 2002. *Authentic happiness: Using the new positive psychology to realize your potential for lasting fulfillment*. Simon and Schuster.

[98] Martin EP Seligman. 2011. *Flourish: A visionary new understanding of happiness and well-being*. Simon and Schuster.

[99] Martin EP Seligman and Mihaly Csikszentmihalyi. 2000. Positive psychology: An introduction. *American Psychologist* 55, 1 (2000), 5–14.

[100] Kennon M Sheldon. 2016. *Putting eudaimonia in its place: On the predictor, not the outcome, side of the equation*. Springer, 531–541.

[101] Janine Shepherd, Melody Oliver, and Grant Schofield. 2015. Convergent validity and test–retest reliability of the authentic happiness inventory in working adults. *Social Indicators Research* 124 (2015), 1049–1058.

[102] Charles Richard Snyder, Shane J Lopez, Lisa M Edwards, and Susana C Marques. 2020. *The Oxford handbook of positive psychology*. Oxford university press.

[103] Peter N Stearns. 2012. The history of happiness. *Harvard business review* 90, 1-2 (2012), 104–109.

[104] Lili Tian, Tingting Yu, and E Scott Huebner. 2017. Achievement goal orientations and adolescents' subjective well-being in school: The mediating roles of academic social comparison directions. *Frontiers in psychology* 8 (2017), 37.

[105] Alexandra To, Angela DR Smith, Dilruba Showkat, Adinawa Adjagbodjou, and Christina Harrington. 2023. Flourishing in the Everyday: Moving Beyond Damage-Centered Design in HCI for BIPOC Communities. In *Proceedings of the 2023 ACM Designing Interactive Systems Conference*. ACM, Pittsburgh, USA, 917–933.

[106] Alexandre N Tuch, Sandra P Roth, Kasper Hornbæk, Klaus Opwis, and Javier A Bargas-Avila. 2012. Is beautiful really usable? Toward understanding the relation between usability, aesthetics, and affect in HCI. *Computers in Human Behavior* 28, 5 (2012), 1596–1607.

[107] Jessica van Wingerden, Arnold B Bakker, and Daantje Derks. 2017. The longitudinal impact of a job crafting intervention. *European Journal of Work and Organizational Psychology* 26, 1 (2017), 107–119.

[108] Llewellyn E Van Zyl, Elmari Deacon, and Sebastiaan Rothmann. 2010. Towards happiness: Experiences of work-role fit, meaningfulness and work engagement of industrial/organisational psychologists in South Africa. *SA Journal of Industrial Psychology* 36, 1 (2010), 1–10.

[109] Daniela Villani, Chiara Cognetta, Claudia Repetto, Silvia Serino, Davide Toniolo, Francesco Scanzi, and Giuseppe Riva. 2018. Promoting emotional well-being in older breast cancer patients: results from an eHealth intervention. *Frontiers in psychology* 9 (2018), 2279.

[110] Joar Vittersø. 2016. *Handbook of eudaimonic well-being*. Springer.

[111] Erin A Vogel, Jason P Rose, Lindsay R Roberts, and Katheryn Eckles. 2014. Social comparison, social media, and self-esteem. *Psychology of popular media culture* 3, 4 (2014), 206.

[112] M Weiser. 1991. The computer for the 21st century. *Scientific American* 265, 3 (1991), 94–104.

[113] Phathara-on Wesarat, Mohmad Yazam Sharif, and Abdul Halim Abdul Majid. 2014. A conceptual framework of happiness at the workplace. *Asian Social Science* 11, 2 (2014), 78–88.

[114] Colin West, Cassie Mogilner, and Sanford E DeVoe. 2021. Happiness from treating the weekend like a vacation. *Social Psychological and Personality Science* 12, 3 (2021), 346–356.

[115] Evan Westenberger. 2023. How Microsoft Teams apps can help improve wellbeing at work. https://techcommunity.microsoft.com/t5/microsoft-teams-blog/how-microsoft-teams-apps-can-help-improve-wellbeing-at-work/ba-p/3919790

[116] Ladd Wheeler and Kunitate Miyake. 1992. Social comparison in everyday life. *Journal of personality and social psychology* 62, 5 (1992), 760.

[117] Kelly Widdicks. 2020. When the good turns ugly: Speculating next steps for digital wellbeing tools. In *Proceedings of the 11th Nordic Conference on Human-Computer Interaction: Shaping Experiences, Shaping Society*. ACM, Tallinn, Estonia, 1–6.

[118] Chris Woolston. 2021. Stagnating salaries present hurdles to career satisfaction. *Nature* 599, 7885 (2021), 519–521.

[119] Paweł W Woźniak, Mitch Hak, Elizaveta Kotova, Jasmin Niess, Marit Bentvelzen, Henrike Weingärtner, Svenja Yvonne Schött, and Jakob Karolus. 2023. Quantifying Meaningful Interaction: Developing the Eudaimonic Technology Experience Scale. In *Proceedings of the 2023 ACM Designing Interactive Systems Conference*. ACM, Pittsburgh, USA, 1904–1914.

[120] Katharina M Zeiner, Michael Burmester, Kristin Haasler, Julian Henschel, Magdalena Laib, and Katharina Schippert. 2018. Designing for positive user experience in work contexts: Experience categories and their applications. *Human Technology* 14, 2 (2018), 140–175.

[121] Daniel Żuromski, Adam Fedyniuk, and Ewelina M Marek. 2018. Can new technologies make us more human? An inquiry on VR technologies in social cognition. *Frontiers in psychology* 9 (2018), 705.