Do Zenware Applications Reduce the Digital Distraction of Knowledge Workers? A Qualitative Study Based on Expert Interviews

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Abstract. Applications helping us to maintain the focus on work are called "Zenware" (from concentration and Zen). While form factors, use cases and functionality vary, all these applications have a common goal: creating uninterrupted, focused attention on the task at hand. The rise of such tools exemplifies the users' desire to control their attention within the context of omnipresent distraction. In expert interviews we investigate approaches in the context of attention-management at the workplace of knowledge workers. To gain a broad understanding, we use judgement sampling in interviews with experts from several disciplines. We especially explore how focus and flow can be stimulated. Our contribution has four components: a brief overview on the state of the art (1), a presentation of the results (2), strategies for coping with digital distractions and design guidelines for future Zenware (3) and an outlook on the overall potential in digital work environments (4).

Keywords: Zenware · Human factors · Human computer interaction · Workspace optimization

1 Introduction

Since time immemorial, mankind has been producing inventions and tools of all kinds: technologies and tools which optimize or even automate processes and thus aim to make everyday life easier. Some of these inventions of the recent past, such as computers, the Internet and portable devices like smartphones, had a huge impact on work surroundings. Almost all aspects of our life have become more efficient: work processes, communication and even dating [1].

Do these technologies make us "better" people? In any case, the human cognitive capacities do not grow in the same speed as computing capacities [2]. Instead, there is a common fear that human capabilities may not suffice to keep up the pace with computing machinery. Buzzwords like "information overload", "infobesity", "Internet addiction", "Email Apnea" and "Digital dementia" show that the possible dangers incited by digital media are now a core societal interest. However, flaming criticism of new technologies is not a new phenomenon – it is at least as old as the written word.

Already Socrates rejected the idea of writing down things, as he believed this would ruin human memory [3]. This already illustrates the basic dilemma that technologies which strive to *facilitate* and *enable,* actually might also *hinder* concentration and thus productivity and well-being.

A few years ago, the journalist Jeffrey MacIntyre coined the term *"Zenware"* [4] for software characterized by functional simplicity rather than a diversity of functions. The term is a short form of "concentration-promoting software", also hinting at "Zen" – a school of Mahayana Buddhism emphasizing rigorous self-control and meditation-practice. MacIntyre describes how the computer user interface has evolved from the (simple) metaphor of the desktop to the complex cockpit of the digital self. He introduces Zenware applications as a way to visually calm down the computer desktop for the sake of productivity. Accordingly, the Macmillan dictionary defines Zenware as "software that is designed to block things that distract you on a computer so that it is easier to concentrate on what you are doing" [5]. Zenware is also frequently mentioned in the field of life-hacking, "a strategy or technique adopted in order to manage one's time and daily activities in a more efficient way" [6].

Examples are the text editors *WriteRoom* and *iA Writer* (Fig. 1) which take up the entire screen without any menu or toolbar. This means one cannot change the font, its size, or place images and tables – only saving and printing are possible. The focus lies completely on a writing process free from distractions.
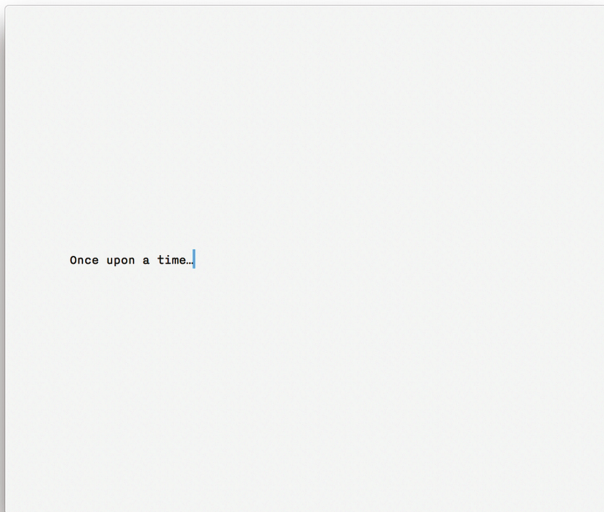
Fig. 1. Screenshot of the writing software iA Writer.

The term Zenware is also used for tools helping users to focus. An example is the software *Freedom* which blocks the Internet connection for a self-selected period of

time, thus preventing the user from being distracted by incoming communication – or from distracting oneself (e.g. by surfing the web).

The spectrum of these software applications is relatively broad and is increasingly expanded for mobile devices. All applications share a seemingly superordinate interest: the creation or preservation of concentration on *one* activity and the avoidance of distractions in human computer interaction. The increasing popularity of such applications suggests that many users want to 'regain' control of their attention. Doing so, they rather rely on self-restriction (voluntary restrictions with the help of software programs) than on self-discipline (will power). One of the interviewed expert states: "You don't adopt Zenware unless you want a distraction-free experience: the sense of entering a placid, protective space that reminds you of the sacredness of your own thinking, that won't clutter your screen with unnecessary functionality, that appreciates the value of your attention" [7].

When interviewing the experts, our leading research question was: how does Zenware impact the use of digital technologies in the workplace of knowledge workers? Our contribution has four components: after a brief overview on the state of the art (Sect. 2) we line out the results of the interviews (Sect. 3), we extract and describe strategies for coping with digital distractions and design guidelines for future distraction-aware software development (Sect. 4). Finally, we give an outlook on their overall potential in the context of digital work environments (Sect. 5).

2 Related Work

In spite of its growing impact and use, so far there has been little research on Zenware. However, the phenomenon is strongly linked to other fields of human computer interaction (HCI). Several research projects focused on interruptions and attention switching at the computer [8]. These studies have consistently demonstrated the negative consequences of interruptions of ongoing tasks, including errors, delays, stress, and the negative effects of contextual changes ("change costs") [9–15].

While distractions due to digital media use are a frequent topic in HCI, engagement received less attention. However, with the shift from usability towards user experience, such "soft" factors gain more interest.

Cognitive absorption, for example, describes the case when people experience total immersion during an activity. This experience is often characterized by intense pleasure, a sense of control, curiosity, and the forgetting of the sense of time. It is associated with perceived user-friendliness as well as a perceived benefitting from IT (information technology) [16]. *Cognitive engagement* is similar to cognitive absorption, involving curiosity, profound interest, and focused attention, but not the feeling of control over the particular situation [17].

Mindfulness refers to a psychological state of concentration (both on internal and external phenomena) with particular emphasis on focused attention on the present moment [18]. Within the framework of organizational work, the term characterizes the circumstance of being aware of fine details, taking the time for exploration and coping with unexpected events [19].

The term "*flow*" [11] describes the optimal experience when carrying out an activity. Some sort of "positive tunnel vision", which presumably everyone has experienced in one or the other activity – from playing video games to fileting a salmon. Time and space move into the background and attention is focused solely on the present task. A task that is neither too demanding nor too simple, and in the best case, shows noticeable progress. An uplifting feeling that seems to be becoming less and less common in computer-assisted work, driven by interruptions and distractions.

As a counter-design to a decrease of concentration through an excessive use of connected devices, a burgeoning movement can be observed, circulating under different names: "calming technology", "slow web", "conscious computing" or "contemplative computing". The aim here, is to expand one's attention span rather than to diminish it, and to replace the sensation of nervous distraction with calm. First impressions can be found, for example, in the form of

- body-borne sensors that help to develop a quiet breathing in computer-assisted work (developed at Calming Technology Laboratory, Stanford University) [20],
- apps for mobile devices that seek concentration through meditation [21] and
- games that help to enjoy a communal meal without digital distractions [22].

The rise of Zenware investigated in this work reflects this movement.

3   Study

The aim of the study is to investigate the forces behind the rise of Zenware, and to derive insights for the future of digital technologies at the computer-assisted workplace of knowledge workers. We used qualitative methods, asking selected experts about their experiences, insights and opinions in guided interviews [23].

The leading research questions were:

1. Which obstacles prevent focused use of digital technologies in the work environment?
2. How can Zenware be used appropriately in the area of computer-assisted work?
3. What are the implications for the future use of digital technologies in the workplace?

3.1   Setup

The experts were selected by *judgement sampling* [24]. This method aims to make the best possible selection of "key informants" (experts) in a two-step process:

First, a theory-based method was used to create a pool of potential experts. The persons to be interviewed were identified as potential experts by virtue of their position or function (and their associated exclusive knowledge). Within the pool, those experts were selected, who were classified as particularly capable and were available for a survey. The process resulted in the panel of eight experts. In the following, they are briefly presented.

- **Anja Baethge**, Ph.D. studies as a psychologist at the Chair of Labor, Organizational and Economic Psychology at the University of Mainz. She studies interruptions and multitasking at the workplace.
- Prof. **Mihály Csíkszentmihályi**, Ph.D. is Professor of Psychology and Management at the University of Claremont and former Head of the Faculty of Psychology at the University of Chicago. He is famous for first describing the concept of flow.
- **Mary Czerwinski** is Head of the Research Group for *Visualization and Interaction (VIBE)* at *Microsoft Research* (MSR), the research institute of Microsoft. In her studies, she is involved with multitasking, task management and attention systems.
- Abbot **Muhō Nölke** (civil name: Olaf Nölke) is the head abbot of the Zen Buddhist temple *Antai-ji* in Japan. Before ordaining, he graduated from the Free University of Berlin in Japanology. In addition to this activity, he published various books on Zen Buddhism as an author and translator.
- **Oliver Reichenstein** majored in Philosophy, German philology and History at the University of Basel. He is the founder and managing director of the Design Agency *Information Architects*, with which he also develops and distributes the "minimalist" writing software *iA Writer* (see also Fig. 1).
- **Alex Soojung-Kim Pang**, Ph.D. is the author of "The Distraction Addiction". He is a senior consultant with a consulting firm, as well as an associate fellow at *Saïd Business School*, Oxford University, and Visiting Scholar at Stanford University. Pang is concerned with *Contemplative Computing* and *Zenware*.
- **Fred Stutzman**, Ph.D. teaches courses about privacy and social media at the *UNC School of Information and Library Science* at the University of North Carolina. As a programmer and entrepreneur, he develops and distributes the applications *Freedom* and *Anti-Social*.
- **Damon Young**, Ph.D. is an Australian philosopher, author and commentator. He is Honorary Fellow for Philosophy at the University of Melbourne. In his book "Distraction: A Philosopher's Guide to Being Free", he is concerned with *distraction* as a fundamental obstacle to *freedom*.

3.2   Results

The results are the experts' assertions. A complete documentation would overstretch the boundaries of this work. Nevertheless, we want to present some of the key messages in respect to each of the three leading research questions.

Obstacles for a focused use of digital technologies in the work environment

"Obviously, you aren't as productive when you are interrupted and you can't get back on task. […] It has been shown that interruptions and multitasking both cause stress, which leads to other, related, mental and physical problems, as well as lower mental ability to make decisions and solve problems." (Czerwinski)
"We're not multi-tasking, we're switching between tasks. And we're doing it badly, because we take time to regain attention. […] This can cause stress and frustration – we are creatures of rhythm, and constant disruption causes anxiety." (Young)

"We are still not sure what the side-effects of personal computers, cell-phones, and so on will be. But certainly we are already suffering from a lack of privacy, of uninterrupted freedom, as a result of these wonderful new appliances. If you care for the quality of your life, you will have to develop strategies to protect your mind from the random incursions of irrelevant information." (Csíkszentmihályi)

The use of Zenware in the area of computer-assisted work

"I'm not familiar with the term "Zenware" but I am aware of movements like mindfulness, meditation and calming technologies. It has been shown empirically that these practices, if done well and for long enough, actually change the way you process information — changes to the brain." (Csíkszentmihályi)

"It's driven by a desire to eliminate or reduce distraction, particularly in the workplace or while engaged in intellectually demanding or creative tasks. […] Giving people the opportunity to practice focus is always a good thing. And the focus itself improves one's capacity for introspection and satisfaction." (Soojung-Kim Pang)

"I've seen some of these programs, and they make sense […]. The basic principle is sound: we know we'll be distracted, so we remove the temptation. This requires two things: a sense of value (i.e. THIS is more important that THAT) and of our own psyche (I know I will be seduced by THAT). […] However, the label 'Zenware' is a little misleading. Zen Buddhists often learn, not only to be more aware of their mental states, but to more carefully train them. Like the Stoics, they learn psychological discipline. When we let the program set limits for us, we might be more productive, but we lose capacities ourselves: to be more self-controlled. So it's a very specific kind of freedom: freedom from (distraction) rather than freedom to (set our own rhythms and focus)." (Young)

"I look at people who use this software as people who are fighting back against broken computers. […] They're expressing agency, they're expressing control and that is very powerful. Part of the reason why the software is so empowering is that you're saying to your computer: "I'm the one in control", rather than the other way around." […] In the end it comes down to discipline and willpower but it's not a fair game, it's not a fair conflict. Because at the same time these companies [like Facebook and Twitter] all have PhDs and psychologists working for them to figure out ways to make themselves more and more addictive. […] In essence the software evens that playing field a little bit." (Stutzman)

"It's pretty clear, from both experimental studies and one's own experience, that certain kinds of environmental cues can nudge us to greater focus or creativity. […] The challenge is figuring out what kinds of environments help you: whether you're the kind of person who is stimulated by the buzz of a coffeehouse, for example, or requires absolute silence. […] I think programs like OmmWriter and WriteRoom bring some of that experience to the computer screen." (Soojung-Kim Pang)

Implications for the future use of digital technologies in the workplace

"Workplace training on the use of technology ought to involve discussion of distraction and its costs – and not just the financial costs. Workplaces should also, where possible, provide spaces for employees to 'retreat' to, without wireless, phones, screens, and so on. Niches to withdraw into one's own company. In other words, freedom from distraction ought to be a more general design principle rather than just a matter for software." (Young)

"I'm no expert on trends in HCI, but I think Zenware highlights the degree to which successful software usage depends on the intent of the user. Zenware doesn't succeed because it breaks your internet connection or gives you a blank screen to write on; it succeeds because it externalizes and mirrors back to users their own desire to focus and be mindful." (Soojung-Kim Pang)

"I think the reality is that Zenware is the next generation of computing. […] I think that these programs are really pushing forward and almost pushing back on the notion that we should always move towards something bigger, better, faster. We really need to slow down and think about the extent to which we can design for simplicity, functionality and effectiveness." (Stutzman)

4   Discussion

In this summarizing discussion, attention will be given to aspects that have been mentioned frequently in the survey, or those that contain a new or high-impact view.

4.1   Dependency

The minimization of disturbing distractions and interruptions seems to be advisable since they are regarded as one of the most important stressors by most experts. However, it is important to bear in mind that many different factors influence productivity.

First and foremost, the nature of the activity: Is it a challenging task that requires absolute concentration? What is the motivation of the person against this background? Is it *intrinsic* or *extrinsic*? If it is extrinsic: Is it *self-determined* or *not self-determined* extrinsic motivation [25]. It is assumed that a sensation of *flow* is most likely if the person is motivated *self-determined extrinsically* or preferably *intrinsically* [26]. But what if the task at hand is a routine task, or a task which is asking too little or too much from the worker? How fast can progress be observed? And what about the time frame?

The dynamics of the workplace lead to changing states of attention that are influenced by a variety of factors, such as the nature of the task, the mood of the person, interactions or circumstances such as time of day, weekday, temperature, noise, etc. [27].

The minimization of disruptive distractions and interruptions is accordingly an advocated (yet not all-embracing) measure in the pursuit of *concentration* and *productivity*.

4.2   Isolation

External interruptions benefit by the perceived necessity of permanent reachability. In this context *self-binding* has been identified as an effective means to commit oneself to undisturbed, concentrated work on a task and to create optimal conditions by preventing potential distractions and interruptions [28]. Such an intermittent isolation in the service of focused attention is therefore an appropriate *self-binding strategy*. Employers in the field of knowledge work should examine in detail whether they offer their employees sufficient retreats – both spatially and temporally.

4.3   Stimulation

The boundaries of self-determined limitation lie in the observation that liberation from distraction and interruption improves the prerequisite for concentration but cannot

guarantee it. Against this background, the desire to specifically stimulate concentration was examined. Some experts argue that certain environmental stimuli can be beneficial to concentration and creativity. The perception, whether a stimulus is hindering or conducive, seems to be highly individual. While *one person* may find focus in absolute silence, the *other* might prefer sitting in a café or playing music to set a certain surround sound atmosphere. This aspect provides a clue for further studies.

In any case, it seems advisable to regularly reflect and assess the own work situation and productivity in regard to what improvements may be possible.

4.4   Digital Technologies

Computers nowadays are more than just working tools. They are the main entertainment medium and command center of the 'digital self'. Private and professional use blur increasingly: Business e-mails are retrieved after working hours [29], while working hours are spent surfing the web for personal matters [30].

The experts did not agree on whether there should be a clear separation of roles in human-computer interaction (*"man thinks, computer calculates"*) – or if human intelligence should be augmented by digital technologies. The opinions also diverge regarding the question of whether computers should be better adapted to the users – or if the users need to increase their level of digital literacy.

4.5   Zenware as a 'Middle Way'

Against this background, Zenware seems to be a *middle way*. Users seem to be dissatisfied with the status quo, strive for a better user experience, and tailor their systems to their personal preferences and requirements using specific programs.

In any case, Zenware is predominantly perceived as a useful concentration aid. While critical voices fear a related 'outsourced self-discipline', others regard it as an 'antidote' for technologies that do not adequately meet the needs of their users. The experts are also in disagreement on whether an increase in productivity through Zenware entails the risk of weakening one's ability to self-control or if it even strengthens it. Certainly the use of Zenware, as one expert stated, can be understood as a reflection of one's own self-commitment to greater concentration and mindfulness – and thus as an expression of the will to control one's own attention.

Clearly, a strength of Zenware lies in the reduction to the essentials. Just as absolute concentration ignores unimportant things of the periphery, most Zenware programs dispense unnecessary functions and interface elements in favor of the very task at hand. A lower cognitive load is also assumed here, which must be investigated further.

The high degree of specialization of the programs at the same time ensures a certain *openness* and *flexibility*. This gives users the possibility to set up their own system according to individual requirements. Thus an expert advocates to view Zenware programs as 'life-enhancing tools', which understand limitation as a means – not an end.

One of the experts even regards Zenware as the future of computer development. Several of them advocate a general rethinking. They point out that on the part of those responsible in the companies the understanding of the importance of concentration and

a (temporarily) quiet working environment often falls short. Therefore, developers and designers should be aware of the interests of the users (*Is absolute concentration desired in this task?*) and design and optimize their software to the best of their knowledge. A large part of the responsibility lies with the developers of operating systems, since they greatly influence the *digital work environment*.

A conceivable starting point would be turning away from a thoughtless striving to increase efficiency and performance and a return to the basic design principle of 'less but better' [31]. Such pausing and reflecting could allow digital technologies to better support their human users by acknowledging the importance of concentration and by respecting the workers' attention.

The degree of unobtrusiveness seems to be a potential criterion for future software development. This seems to be particularly relevant against the backdrop of the rise of "wearable computing". Here, the possibility to raise the awareness for one's own behavior, to identify potential stressors and to change habits is given. For this purpose, it would be desirable if not only metric data were collected and evaluated, but also mental aspects would be considered.

Whether such and other technologies will be helpful tools or merely entertaining gadgets depends on the question of the right degree of simplicity, expediency, efficiency and unobtrusiveness. These attributes should be further explored in relation to a potential contextual adaption and optimization of the user interface.

5   Conclusion

After a brief overview of the related research on possible risks of frequent interruptions and distractions at the workplace (and their potential circumvention) we presented some of the key statements from the expert interviews. Based on the interviews, we discussed aspects that have been mentioned frequently – dependency, isolation, stimulation and finally Zenware as a 'middle way'.

Rather than summarizing this discussion, we want to present six recommendations for coping with digital distractions and design guidelines for distraction-aware software development:

1. More Mindfulness: Reflection enables insights that in turn can mean less stress and more productivity.
2. Set Priorities: Not every stimulus deserves attention, a stricter selection prevents fatigue and stress.
3. Develop and test strategies for protecting the mind: Multitasking and information processing cost energy – saving resources means acting tactically wise. Workers could divide working hours into time slots which meet both demanding and less demanding activities and requirements. For example, fixed "communication times" could be created for emails and telephone calls, or similar activities could be bundled (instead of switching back and forth between different types of activities).
4. Self-discipline and concentration: the disciplined ability to concentrate is a valuable and necessary feature in the work environment. Whether meditation or brain training – there are many possibilities.

5. Know and prevent temptations: Some distractions are designed to be as irresistible as possible – software can help avoiding temptations from the start. Distractions (such as social media) should be understood as a 'snack', which is deliberately 'enjoyed' for a limited period of time.
6. Search, find and use the personal nudge: One of the most promising enablers for deep focus is intrinsic motivation – additionally certain rituals or environmental stimuli seem capable of inspiring concentration and flow [32].
7. Use and/or create applications that meet the high dynamics of different states of attention in the work environment. Such applications share the following properties: simplicity, expediency, efficiency, and unobtrusiveness.

The discussion on the use of digital technologies must not ignore the role of human beings. Knowledge workers should critically reflect their personal patterns of use and take responsibility and control in dealing with digital technologies. The fact that this is not an easy task has been shown by the dynamism of the contemporary workplace, the computer and the Internet against the background of distraction and interruption.

The avoidance of distraction and interruption through "digital helpers" may improve the chances of concentrated work, but it is the individual's will and ability to make use of such circumstances. The self-imposed restriction by software can be interpreted as a signal for the desire of numerous users for a more sustainable use of the 'resource' attention. The extent to which this desire of individuals is related to a general necessity should be the subject of future consideration.

Limitations. This work is only a first approximation on a subject that requires more research. Without a user study and quantitative data, we could not provide an answer to the extent in which Zenware affects productivity, efficiency or well-being of users.

In any case, the knowledge of the risks of distraction and interruption is a first step towards digital literacy in the workplace (and in general). If the first step is *realization*, the second may lie in *taking responsibility* and *control*. Digital technologies open up possibilities and facilitate processes – they expand the 'performance spectrum' of human beings. Zenware is, in this sense, not a *solution to the problem* (of distraction and interruption), but a supporting *means for the purpose* (better concentration) in the form of *'liberating restriction'*.

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