A Day in the Life: Exploring the Use of Scheduled Mobile Chat Messages for Career Guidance

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ABSTRACT

Common sources of career information like websites often provide a static overall picture of a job, yet lack personal insights into the daily working life. To address this problem, we present a novel mobile career guidance method: It enables users to remotely gain an impression of different work routines by receiving several short, scheduled chat messages from a persona throughout the day. These messages were previously collected from real professionals reporting on their tasks over a week. We implemented a smartphone application to compare our message-based approach to a traditional blog entry in a two-week within-subject field study ($N = 17$). Users highlighted that the scheduled messages (1) enhanced their understanding of work routines by integrating career information into their own daily context and (2) offered authentic insights into the jobs. We discuss design implications for mobile career guidance systems and future opportunities for presenting chunks of information in a temporal context.

CCS CONCEPTS

• **Information systems** → *Decision support systems*; • **Human-centered computing** → *Field studies*; *Smartphones*.

KEYWORDS

mobile application; career choice; career guidance system; decision support system; micro-tasking

1 INTRODUCTION

Choosing a career is one of the most important decisions in life. It is a complex process that is influenced by many internal and external factors [2, 12]. A lot of young people struggle with making a career decision, as today's job market offers a wide range of opportunities. They need to gather all kinds of information, not only about themselves but also about possible prospective jobs. A common way of dealing with this problem is talking to people, e.g., working professionals or career counselors. Another option is gaining practical experience as a working student or intern. Both of these methods have the advantage of providing realistic impressions of specific jobs and help people compare their expectations to the career profile. However, these approaches are time-consuming and do not scale well to getting informed about many jobs, as they require arranging meetings with other people or companies.

The internet can be a useful tool to get an overview of potential jobs and narrow down options. A large number of online career guidance systems have been developed over the last decades [28]. They provide extensive collections of job profiles and tests to evaluate the user's personal interests. The advantages of such digital career guidance systems are that they are easily accessible and require low effort in comparison to the personal approaches.

Mobile devices have great potential to facilitate the process even more, by making content available in a broad range of contexts, such as while commuting [8]. However, it is important to consider mobile-specific features and usage patterns when designing a career guidance app. Many current tools have only been adapted to the mobile context in terms of design but not regarding structure and content. Scrolling through a detailed job report can get cumbersome on a small screen. Mobile use is also prone to interruptions, which can reduce the user's ability to focus on their reading task over an extended period of time [19, 20]. If designed well, we see great potential of new mobile app-based career decision support systems to enable people (1) to use idle times productively, and (2) to reflect on job information in many situations, for example, to compare job routines to own daily routines.

In this work, we thus aim to combine the advantages of personal and internet-based career guidance systems, that is, providing realistic job experiences delivered with ubiquitous mobile access. To achieve this, we present a novel app-based concept for career decision support, that is particularly tailored to the characteristics of
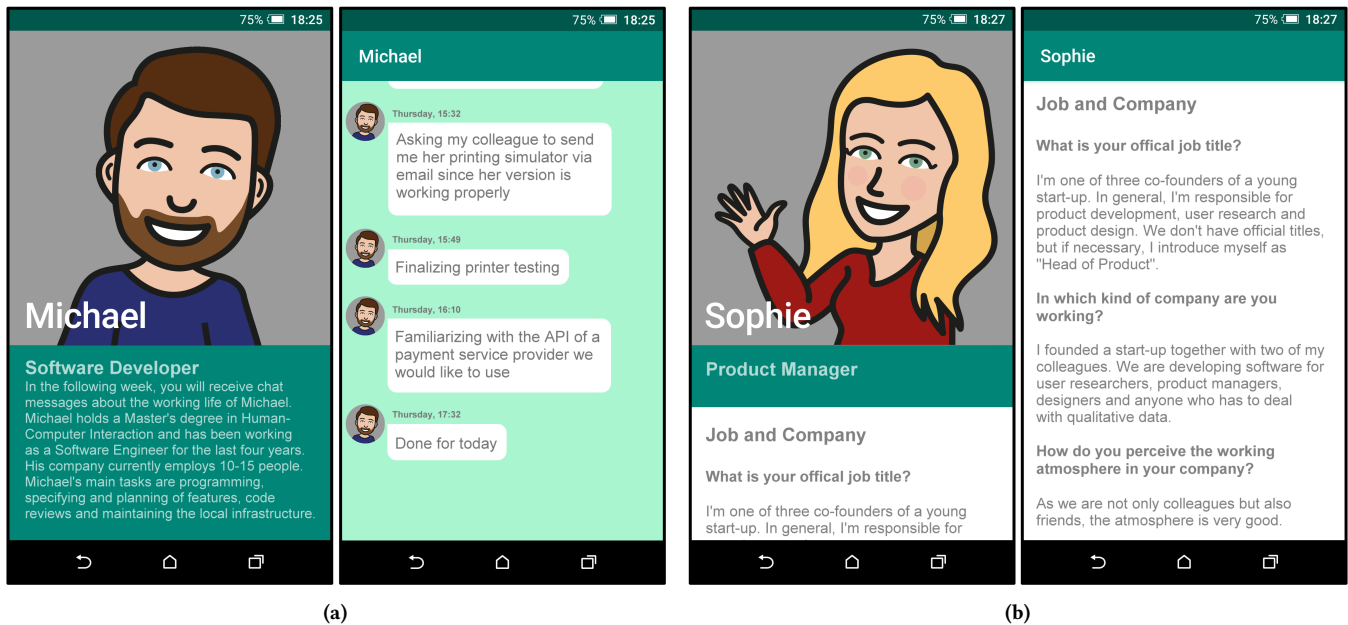
Figure 1: The two views of our app: (a) The chat view sends the user messages about a persona's work routine throughout the day. *Left:* **Top of the view with portrait and description.** *Right:* **Scrolling down reveals the chat history. (b) The blog view serves as a baseline in our main study.** *Left:* **Top of the view with portrait and job title.** *Right:* **Scrolling reveals the full blog text (interview with the persona).**

smartphone interaction. Within our app, the user receives chat messages about the working life of a specific persona sent throughout the day (see Figure 1a). The app's content is based on pre-recorded working logs of real professionals: The messages are stored in a database and sent to the users according to their timestamps (day of week & time of day) in "pseudo real-time". These small chunks of information can be read with low effort during idle times or habitual notification checking [23]. Therefore, the user can progressively obtain a detailed picture of the concrete tasks and the schedule of the professional. By sending the messages in a temporal context matching the user's own context (i.e., same weekday and time), we aim to help users reflect on whether they could see themselves in the persona's position. In this first evaluation of the concept, we focus on one-way textual content. We deliberately excluded an answer function at this stage, as two-sided communication, e.g., via a chatbot, would have introduced many additional design dimensions.

In summary, we contribute a smartphone application for career guidance, giving users a detailed impression of work routines in specific jobs. We derive implications for the design and future investigation of systems that provide information in a temporal context via scheduled mobile chat messages.

2 BACKGROUND AND RELATED WORK

This section outlines potential problems in the process of making career decisions and presents prior research on computer-assisted systems to support career choices. We then particularly discuss mobile applications and how their pervasive nature facilitates content presentation and engagement through micro-tasking.

2.1 Problems in Career Decision-Making

The domain of career decision problems has been widely explored [10, 11, 17]: Gati et al. [10] provide a taxonomy of problems that may occur during different stages of the career decision process. They define three main clusters of possible difficulties: (1) lack of readiness, e.g., due to indecisiveness, (2) lack of information, e.g., on self or on different occupations, and (3) inconsistent information, e.g., caused by internal or external conflicts. A related theoretical model was developed by Germeijs et al. [11], who view career indecision from the perspective of normative decision theory. They also identify three major problems: (1) insufficient information about the alternatives, (2) problems in valuing the different options, and (3) uncertainty about the outcomes. In this work, we particularly address the key problem at the intersection of both models, namely the lack of information on different career options.

2.2 Computer-assisted Career Guidance

Due to the complexity of career decision-making, many people seek assistance during the process. HCI and computer science research have responded to this as well: The first computer-assisted career guidance systems have been implemented in the late 1960s to complement personal career counseling [13]. Nowadays, the internet provides a wide range of opportunities to support career choices [28]. Online tools have the advantages of reducing costs, extending access to job information, and offering new possibilities for interactive content [22, 28]. Sampson et al. further highlight the potential beneficial outcomes of distance career counseling, i.e., anonymity, perception of safety and disinhibition, convenience,

room for thoughtful reflection between interactions, and access to specialized practitioners [24]. Established internet-based systems range from online versions of paper-pencil tests [16], over career development interventions [14], to serious games [9]. More recent examples explore social media-based career information [25] or chatbots for advising students [18]. Most of the internet-based career guidance systems are web platforms designed for desktop use [28], however, more and more mobile applications are being published. While there are several commercial apps for career guidance available (e.g., CareerPilot[1] or CareerGuide[2]), we are the first to use scheduled messages to convey job information in a temporal context.

2.3 Micro-Tasking

Designing mobile apps in this domain comes with two key challenges: The first one is the limited display size of smartphones [1]. Career guidance systems usually provide users with a large amount of data on different career alternatives. Young people are quickly overwhelmed by this information, which can lead to disengagement from career development [27]. Therefore, the content needs to be re-arranged to prevent information overload and facilitate exploring the data on a small screen. The second challenge is that mobile phone use is characterized by multitasking, leading to possible interruptions when trying to focus on a single task [19, 20]. We address both of these problems by applying the concept of micro-tasking, i.e., breaking down the content into smaller chunks [6] – a format that is optimally suited for small-screen devices.

Micro-tasking has already been successfully employed in other domains, such as mobile learning [5, 21] or micro-productivity [15, 29]. In the context of learning, the trend towards shorter units and shorter interactions is called "micro-learning". The learning content gets broken down into smaller "chunks", designed to be aligned with the limits of human memory and processing capabilities [5]. It has shown to enhance perceived competence and autonomy [21] and also serves the purpose of visually fitting the small screens of mobile devices.

Applying micro-tasking to the work context, Iqbal et al. [15] designed a tool to edit documents on mobile devices, breaking bigger tasks down into smaller chunks to meet the requirements of mobile interaction. They were able to show that their micro-productivity tool made participants feel less stressed, more productive, and helped them achieve more edits [15]. In a similar setting, Williams et al. [29] introduced the app "Mercury" which generates micro-tasks for programmers who want to work on their code on the go. The micro-tasks generated by Mercury supported the programmers in creating meaningful work experiences even in only brief moments of engagement, and handle interruptions during their work more easily [29].

In our use case of career guidance, we apply the micro-tasking principle by sending the user chunks of information in a chat message format. These messages are short and presented to users over the course of the day. Thus, they are designed to render the content easy to engage with, easy to process, and easy to remember.

2.4 A Day in the Life

A lot of young people seem to base their career decision on whether they can imagine themselves doing the job that they find appealing [27]. Looking into "a day in the life" of a professional can be a way to verify this self-image. It is found in many examples in practice: Articles about people working in computer science have been published by the ACM in their student magazine "XRDS: Crossroads", e.g., a profile of William Stallings about his work as a computer science author [26]. The German Federal Employment Agency also provides numerous examples of daily work routines[3]. Video logs (vlogs) are another way of giving the users insights into a professional's life. Presented jobs range from software engineering[4] to the medical domain[5]. However, in written job profiles or vlogs, the content is made available to the users all at once. In contrast, we explore delivering information via chat messages over an extended period of time. We expect this approach to better cater to the described characteristics of smartphone interaction and to leave more space for self-reflection processes.

3 RESEARCH QUESTIONS

In this work, we aim to answer the following research questions:

(1) **How do the scheduled chat messages influence the perception of career options?**
  (a) Does sending small chunks of information in a temporal context help users get insights into a professional's work routine?
  (b) Does our concept support them in establishing an informed opinion on their personal fit for the presented job?
(2) **What are implications for the user-centered design of a mobile application for career guidance?**
  (a) How should content be presented?
  (b) How should interactions be designed?

To address these questions, we provide a rich qualitative analysis of the *Day in the Life* concept. The concept was informed by a two-week pre-study with six people and further evaluated in a two-week field study with 17 people.

4 PRE-STUDY

To inform the design of our prototype, we performed a two-week preliminary user study with HCI students of our university ($N = 6$). The goal of the study was to gather qualitative feedback on the general idea of receiving scheduled chat messages for career guidance and find out how they should be designed in terms of length, quantity, and wording.

4.1 Phase 1: Collecting Messages from Professionals

To generate realistic content for the chat messages, we first recruited two former HCI students and asked them to keep record of their

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[1]CareerPilot - Career Personality Test: https://play.google.com/store/apps/details?id=com.gocareerpilot.careertest, last accessed 2021/10/10
[2]CareerGuide - The Student Career Counselling App: https://play.google.com/store/apps/details?id=com.careerguide, last accessed 2021/10/10

[3]Tagesabläufe – planet-beruf.de: https://planet-beruf.de/schuelerinnen/berufe-finden/tagesablaeufe, last accessed 2021/10/10
[4]A Day in the Life of a Software Engineer: https://youtu.be/eQBvBtJd6wE, last accessed 2021/10/10
[5]A Day in the Life of a Surgeon: https://youtu.be/PaN4S8qciOw, last accessed 2021/10/10

daily tasks at work over one week (five working days), in the form of chat messages. One of them was a male software developer, the other one a female marketing manager. We consider these jobs to represent two different points on the broad spectrum of job opportunities for HCI students. We told the alumni to imagine addressing their messages to a person who does not know much about their job. Furthermore, we asked them to keep the statements mostly objective. The alumni received a voucher for an online store to compensate them for their efforts. We collected the alumni's recordings and saved them in a data table according to their timestamps. To preserve the individuality of the chat messages, we decided to edit the content as little as possible. We only adapted day-specific content such as weather information that could confound the illusion of receiving the messages in "real-time".

The final data set consisted of 27 messages for the software developer and 38 for the marketing manager. The messages were mostly distributed equally among the days of the week. Content-wise, the messages of the alumni differed in the level of detail of the descriptions. While the marketing manager described her tasks on a meta-level, e.g., "Budget planning for social media advertising", the software developer provided more technical detail, e.g., "Current file browser plugin seems to be unusable due to obsolete dependencies. Looking for different options". We valued these differences in the data sets as we wanted to evaluate the user perception of alternative message designs.

4.2 Phase 2: Delivering Messages to Users

In the second phase, we used the chat app WhatsApp[6] to deliver the collected messages to users: We created a chat group for each job. The groups were named according to the job title and had a portrait from a royalty-free image database as "profile picture". As study participants, we recruited six HCI students via social media, all regular WhatsApp users. In the call for participation, we highlighted that the study was about career opportunities. We sent the participants further information on the study procedure and data protection regulations. After written consent, they were added to the two WhatsApp groups at random: Three started in the *marketing manager group*, three in the *software developer group*. The groups were flipped after one week. We created short persona descriptions with name, age, job title, as well as information on the employer and typical tasks. We altered the names and described the company in a very general way to preserve anonymity. Each persona description was posted into the corresponding group on the first day of each week. After that, we manually sent out the chat messages collected in phase 1 according to their timestamps (time of day & day of week). Participants were instructed to use the group in read-only mode, i.e., not to post anything themselves. Furthermore, we asked them not to mute the group so that they would receive message notifications immediately.

After the two-week study, we conducted semi-structured interviews with the participants. We asked them about their general experience with the concept, the characteristics of the messages, their perception of the jobs and personas, and the scheduled delivery of messages in particular. Furthermore, we invited them to share any critique or suggestions for improvement. We analyzed

the interview transcripts individually for each interview question. For open and explorative questions, we grouped similar statements and two researchers extracted emerging themes.

4.3 Results and Discussion

Six HCI students (two female, four male) participated in the study. One was enrolled in a Master's program, the others in a Bachelor's program. Their mean age was 26.67 years (range 21 to 33 years). All stated that they read all messages usually shortly after receiving them and sometimes after a few hours.

4.3.1 Message Characteristics. Half of the participants said the number of messages was appropriate for both personas (P3, P5, P6). The other three perceived the marketing manager's messages as "a little too many" (P1, P2, P4). P2 would have preferred to get more messages from the software developer.

Four participants stated that the length of the messages was adequate to get a first impression of the jobs (P2, P3, P4, P6). They explained that the ideal length depends on the reported task (P3) and individual preferences (P6). P1 found the marketing manager's messages too short, while P5 valued the brief statements.

4.3.2 Content and Presentation. The majority of participants particularly valued concrete descriptions of specific workflows, rather than messages on commonly known tasks, e.g., checking email or lunch breaks (P2, P4, P5, P6). P5 highlighted that a mixture of detailed explanations and general notes on the workday rendered the content interesting.

P3 liked the objective character of the messages, yet all others would have also been interested in the subjective opinion of the personas. For example, they would have liked to know how enjoyable or stressful a task was (P1, P2) or how the job impacts the personas' free time (P6).

We asked participants whether they had missed the possibility to respond to the messages: In some cases, they would have liked to request details (P1, P3, P5, P6) or clarification (P4). However, two people mentioned that the passive presentation of information considerably reduced interaction effort, as the messages could easily be read directly in the phone's push notifications without opening WhatsApp (P1, P2).

Another question asked if participants had wished for multimedia content such as images, videos, or voicemails: P1 mentioned that this would increase effort, particularly when used in public spaces, stating that "I wouldn't watch videos in public transport because I would need to put on headphones". P2 and P3 said that they did not miss multimedia content during the study. None of the participants were in favor of voicemails. However, half of them could imagine enhancing the text with suitable visual elements (P2, P3, P6), e.g., photos of the office or task-related diagrams. In addition, P1 and P5 criticized the personas' profile pictures and identified them as "stock images". They suggested more realistic photos or abstract avatars.

4.3.3 Persona and Job. The chat messages helped all participants improve their imagination of the jobs. For example, they explained: "The picture I had in my mind was only part of what they are really doing." (P6) or "I was reassured that he did what I expected him to do." (P2). Five of the participants had a clear preference for one

of the jobs after completing the study, whereas P5 showed equal interest in both.

We asked participants whether they had missed some information on the personas or their jobs. They answered that they would have liked to know more about salary and promotion prospects (P1, P2), team size (P3), and atmosphere at the workplace (P4), as well as the persona's professional qualification, e.g., their type of university degree (P1, P4, P6).

4.3.4 Overall Concept. We finally asked participants to reflect on the overall concept: All commented positively on the chat-based idea, highlighting, for instance, low effort and practicality in daily life (P1, P2, P5, P6), interest through "live" updates (P3), and a more personal approach than reading about career options on the web (P4). Distributing messages over the course of the day in particular facilitated perception of the personas' daily routines, such as getting up early (P1, P2, P4, P6). Moreover, it helped people to connect to the routine (P5), feeling closer to it (P2, P3).

When asked about potential downsides, participants judged the message approach as less personal compared to actual contacts (P1, P6). Opinions on not being able to reply to the personas differed (P3 pro, P4 contra). Finally, for an actual app, people overall wished for more options (e.g., more jobs, longer duration, withdrawal if not interested).

4.4 Design Implications

From the pre-study, we learned that our concept of message-based presentation of career information is promisingly received. Based on people's feedback and our observations, we derived implications for an improved prototype and a follow-up study: First, we decided to keep our focus on text content to reduce effort and since opinions were mixed on other media. This also avoids potential privacy and security concerns about taking photos in a corporate environment. Second, desired content, length, and number of messages depended on the presented jobs as well as on the users' preferences. This motivated us to further investigate these properties. Third, people enjoyed subjective tones in the messages, which we thus decided to ask for more explicitly when gathering messages for the main study. Related, stock photos – recognized as such – should be replaced to deliver more personal impressions of the personas. Fourth, persona descriptions should include more information on salary, prospects, personal career, and degree. With these insights, we designed and implemented a dedicated mobile app, which is described next.

5 MOBILE APPLICATION

To evaluate the *Day in the Life* concept, we built an Android application, which we then used to conduct our study. Our app has two main views, which were used as the conditions for the comparative evaluation: (1) the *chat view* (Figure 1a) and (2) the *blog view* (Figure 1b). While our new message-based concept is represented in the chat view, the blog view contains a written interview serving as a baseline condition in our study. For evaluation purposes, we also implemented functionalities to display experience sampling questionnaires and manage the study schedule.

5.1 Chat View

The chat view is shown in Figure 1a. It was inspired by the WhatsApp chat we used in the pre-study. Based on the participants' feedback, we replaced the stock photo with an abstract, comic-like portrait. We added data on personal career and degree to the persona description and fixated it on top of the message view. Vertical scrolling hides the persona's portrait and description and reveals the message history. We decided not to include an answer function in the prototype, as the current stage of our concept focuses on passively receiving job information.

5.2 Blog View

The blog view (Figure 1b) shows a comprehensive written interview about a persona's working life in the format of a blog entry. We designed the UI analogously to the chat view. The blog provides several advantages in comparison to other traditional methods for gathering career information like internet search or personal meetings: (1) it is suitable for mobile devices, (2) its content can be modified, (3) it is cost-efficient, and (4) it scales well. Overall, this leads to good comparability with our message-based concept. We therefore chose the blog as a baseline condition for the main study.

5.3 Backend

Our backend is based on Google's Firebase application development platform[7]. We used its online database as central storage, from which the app retrieved the job information (messages, blog text). The app also logged anonymized information collected throughout the study in this database. The logging data consists of (1) the user's answers to the experience sampling questionnaires (see Section *Apparatus*), including start time, end time, and the corresponding chat message and (2) usage statistics, i.e., the number of times the app was opened over the course of the study.

6 USER STUDY

We used the mobile application in our main user study to evaluate the chat message concept in more detail and compare it to the blog entry as a baseline condition. We conducted a two-week field study using a within-subject design, i.e., all of the participants interacted with both conditions (chat and blog) in randomized order (see Figure 2).

6.1 Content

To gather content for the main study, we again recruited former HCI students. We did not re-use the content from the pre-study, as we wanted to further investigate the preferred length, number, and content of messages. Three alumni agreed to participate in the first phase of information gathering. We then chose the two most thoroughly collected datasets: One was from a product manager and co-founder of a start-up, the other from a software developer at a small company. The collected data was anonymized to ensure privacy for the alumni and their company. As both alumni were male, we changed the gender of the product manager's persona to female to avoid biasing the study participants. The resulting personas "Michael" and "Sophie" are depicted in Figure 1a and

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[7]Firebase: https://firebase.google.com, last accessed 2021/10/10

Figure 1b, respectively. The alumni were given detailed guidelines on how to document their workday, to guarantee comparability of the blog entry and the chat messages. After delivering the desired content as described below, the alumni were compensated with a voucher for an online store.

6.1.1 Blog Entry. For the blog entry, we derived a set of interview questions from examples from practice of online job reports, e.g., by the German Federal Employment Agency[8]. We also took into account feedback from the pre-study and included questions on salary, degree, and job prospects. After collecting a comprehensive set of questions, we structured them among four main categories: (1) job and company, (2) daily work routine, (3) personal experiences, and (4) professional development. We sent the final interview guideline, consisting of 21 questions, to the alumni and added information on the goals of the user study. We also provided them with an exemplary graduate portrait on our group's blog[9]. The length of the final blog entry was 694 words for the software developer and 610 for the product manager.

6.1.2 Chat Messages. After answering the written interview for the blog entry, the alumni were asked to keep record of their daily tasks for the duration of one week (five working days). They could either take notes directly while being at work or write down the protocol later to avoid interruptions during their working hours. We told them that there was no need to report the timestamps very precisely but rather give an example of their typical work routine. In contrast to the pre-study, we did not instruct the alumni to phrase objective messages but rather told them to include any information that could be interesting for HCI students. We asked them to keep in mind the interview's topics and to describe, for example, whom they are working with or if a specific task is enjoyable to them. We informed the alumni that people in the study would only either see their blog entry *or* their chat messages (Note: as shown in Figure 2, each participant indeed used both blog and chat – but from different alumni, counterbalanced). Hence, we emphasized that covering the same aspects in both blog and chat was desirable. Similar to the pre-study, we used the raw data and only adapted day-specific content, possibly confounding the "real-time" experience. The final data set for the main study consisted of 73 messages by the software developer and 29 messages by the product manager. We appreciated this large difference since the participants of the pre-study were rather indecisive regarding the ideal number of messages.

6.2 Apparatus

The study used our Android app and the following questionnaires: The **pre-study questionnaire** had questions on demographics, smartphone use, familiarity with career guidance methods, work experience, and prior knowledge on and interest in the presented jobs.

The **experience sampling (ESM) questionnaire** was implemented to record usage contexts of the chat view with three items: (1) current location of the participant, (2) who they were with, and (3) what they were doing prior to using the app. We randomly

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[8]Bundesagentur für Arbeit: https://www.arbeitsagentur.de/en/welcome, last accessed 2021/10/10
[9]Ehemaligenportrait: https://mediainformatics.wordpress.com/category/sonstiges/ehemaligenportrait, last accessed 2021/10/10
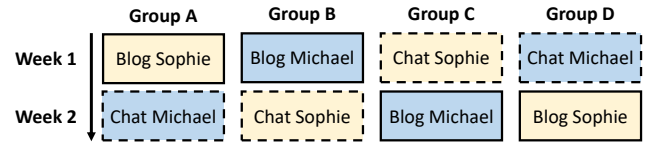

Figure 2: Counterbalanced within-subject study design: Two-week schedule for each user group (colour=persona/job, border=method)

triggered ESM for two messages per weekday: one in the first and one in the second half of the day, to cover a range of contexts. The ESM questionnaire opened when the user tapped on the message's notification.

The **blog questionnaire** and the **chat questionnaire** were used to gain feedback on each of the views, including the System Usability Scale [4]. To find out if people were able to memorize the presented information, we developed seven recall questions for each of the jobs: All four topics of the blog content were covered, with a focus on the "daily work routine" category (four questions). We ensured that the answers to these questions were included in both, the interview answers and either the messages or the persona description. The chat and blog questionnaires also contained Likert items on job impressions and open questions for feedback on the concept and the app in general. The blog questionnaire additionally featured questions on the usage context, as there was no ESM in the blog view.

In the **post-study questionnaire**, people again indicated their knowledge of and interest in the two jobs. We also included a mix of open-ended and closed-ended questions on the (dis)advantages of both views (chat versus blog).

Finally, we used **semi-structured interviews**, similar to the pre-study. We shortened the questions on jobs and personas, as these were covered by the questionnaires and added a set of questions about the blog. We also included a discussion and comparison of chat and blog, as well as an open question for suggestions and further improvements.

The analysis of open-ended questions and interview transcripts was performed in the same way as in the pre-study: Two researchers grouped individual statements according to the questionnaire items and extracted relevant themes.

6.3 Procedure

After study introduction and written consent, participants received the link to our pre-study questionnaire via email and installed our Android app on their personal smartphones. They were guided through the study schedule by smartphone notifications and email reminders. The study started on a Monday to fit the schedule of the recorded messages. We randomly assigned participants to four groups: Groups A and B started with the blog view, while C and D first used the chat view. The first week's persona was Sophie (product manager) for groups A and C, and Michael (software developer) for B and D. Both view and persona were flipped after a week (Figure 2). While the chat view was updated throughout the week, the blog view was only shown in the app on Monday. We restricted

the blog's availability to have better control over the elapsed time between reading the blog/interview and answering the recall questions. We will report and discuss our results with regard to this potential imbalance to avoid unfair comparisons based on different exposure times. The links for the blog and the chat questionnaire were revealed in the app one day after finishing the interaction with the respective view and had to be answered before midnight. After finishing the study, we sent the post-study questionnaire link to the participants and invited them for an optional interview. They were compensated with vouchers for an online store or study credit points.

6.4 Participants

We recruited 17 students (7 female, 10 male) from HCI and computer science with a mean age of 25 years (range 21 to 30 years). Nine students studied for their Bachelor's degree, eight for their Master's. Three people had fixed plans for their job after graduation, the rest of them were still undecided. Regarding the presented professions, eleven students claimed to already have experience with software development, while no one stated this for product management.

6.5 Study Limitations

We evaluated the *Day in the Life* concept exemplary for two jobs (software developer and product manager). The jobs and descriptions presented to participants are experience reports of two professionals. Thus, these reports are subjective and cannot be generalized to perfectly represent the jobs in all facets. Moreover, interaction with our career guidance application in the wild might show discrepancies with the use in the presented study. Participants were encouraged to follow the chat messages, and thus potentially did not mirror real-world behavior. Furthermore, the experience sampling questionnaires presented during the chat view requested additional attention. Although ESM is a frequently used evaluation method, applying it in the chat view might influence the overall rating of this condition.

7 RESULTS

7.1 Influence on Perceived Knowledge

Figure 3a shows the Likert ratings of people's self-rated (i.e., perceived) knowledge of the two professions. We compared these ratings before and after using the app (Wilcoxon signed-rank tests; significance reported at the .05 level).

Split by profession, we obtained the following results: For the software developer, we found no significant difference. This is likely due to the high knowledge about this profession before the study (median 4). Looking at individual users supports this: The three people with starting knowledge below 4 all increased their ratings after using the app (from 2 to 3, 1 to 5, and 2 to 5). For the product manager, the differences were significant ($Z = -3.26, p < .005$). Thus, people rated their knowledge about this profession as significantly higher after using the app (median: before 1, after 3).

Split by view (i.e., chat vs blog), we obtained these results: For both chat and blog view, we found significant differences between ratings of knowledge about the professions before and after the study (chat: $Z = -2.30, p < .05$; blog: $Z = -2.83, p < .01$). There was no significant difference between chat and blog regarding the

increase of knowledge ratings. In other words, according to these self-assessments, people perceived to have gained knowledge with both chat and blog views, and about equally so.

7.2 Influence on Interest

Figure 3a further shows the ratings on whether people could imagine themselves working in these professions. Here, we found no significant differences and no changes in median ratings (3 before and after for both professions). In other words, using the app neither systematically convinced nor discouraged people from imagining taking on these jobs.

Comparing individual ratings split by profession, we found the following changes: For the developer, eight people changed their rating after using the app (4 increases, 4 decreases). These changes reduced the number of people rating neutral by one (from 5 to 4). For the product manager, ten people changed their rating (6 increases, 4 decreases). This reduced the number of people rating neutral by seven (from 11 to 4).

Split by view, we observed eleven changed ratings after using the chat (5 increases, 6 decreases) and seven after using the blog (5 increases, 2 decreases). The number of neutral ratings was reduced by six with the chat view (from 10 to 4) and by two with the blog view (from 6 to 4).

In summary, either view in the app influenced people's ratings on imagining themselves working in the presented professions – individually, in both directions, leading to fewer neutral (i.e., undecided) ratings. This was more prominent for the product manager than for the developer, likely since people had more prior knowledge about the latter.

7.3 Influence on Job Impression

Figure 3b shows the results of four questions on our app's potential for gaining an impression of the professions. The vast majority of ratings are positive. We found no significant differences between chat and blog for these questions (Wilcoxon signed-rank tests, all $p > .05$). Descriptively, we observed trends, which are also in line with the interviews and subjective feedback (see *Discussion* Section): The blog was rated higher for gaining a good overview than the chat. In contrast, the chat was rated higher for gaining a concrete impression of the professions' daily work routines. The chat was also rated slightly higher in terms of gaining a realistic impression. For judging one's own fit for the profession both views were rated similarly; ratings were marginally higher for the blog.

7.4 Usability

To assess the usability of the chat and the blog view, we applied the original version of the System Usability Scale (SUS) [4]. The questionnaire consists of ten items with a five-point Likert scale. The resulting aggregated scores range from 0 to 100, with values over 70 attesting an acceptable level of usability [3]. The blog view reached an average score of 84.7 ($SD = 9.7, min = 67.5, max = 95.0$), which was slightly higher than the chat view's average score of 81.9 ($SD = 11.2, min = 57.5, max = 97.5$). A paired sample t-test found no significant differences between both views ($t(16) = 1.135, p = .27$).
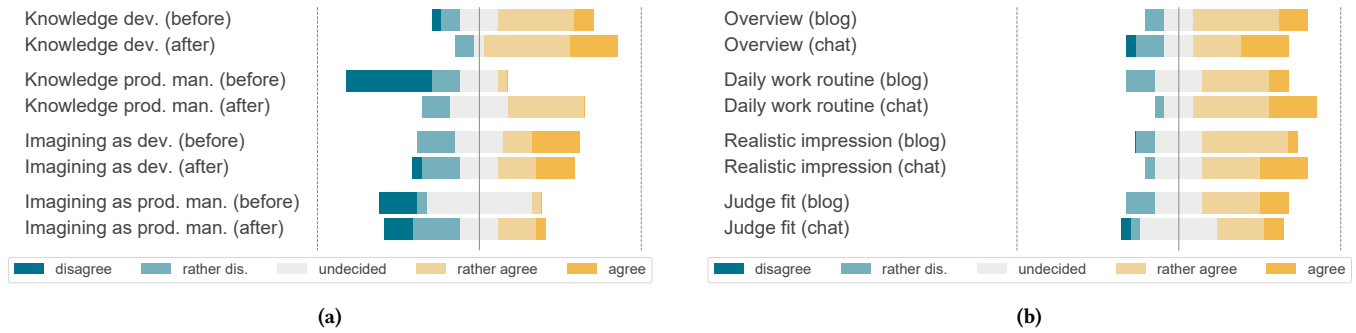
(a)

(b)

Figure 3: Likert ratings: (a) perceived knowledge on the professions and assessment of being able to imagine themselves working in these jobs (before and after using the app, aggregated across both conditions); (b) questions on the user's impression of the jobs (presented by either blog or chat): *I gained a good overview of the profession, I can imagine what the daily work routine looks like, I gained a realistic impression, I can better judge how well this profession fits me.*

Taking into account the adjective rating scale introduced by Bangor et al. [3], we can conclude that users awarded equally "good" usability scores to both views.

7.5 Usage Context

On average, users opened the blog view 5.35 times (SD = 3.06), and the chat view 62.35 times (SD = 49.58). Technical issues with some devices triggered ESM more often than anticipated: People on average answered 19.82 ESM questionnaires (SD = 7.95), resulting in an increased number of reported contexts. For the chat, people reported the following contexts in the ESM questionnaires: The most frequent locations were *at home* (on average 8.8 times per person), *at work* (3.8), *on public transport* (1.6), *outside* (1.4), *at friends'/family's* (1.2). The most frequent social contexts were *alone* (7.1), *colleagues* (3.2), *partner* (2.7), *friends* (2.5), and *family* (1.8). Finally, the most frequent activities prior to reading the chat messages were *working* (6.4), *relaxing* (4.4), *media/entertainment* (2.4), and *eating* (2.4). All contexts not listed here had an average of less than one time per participant. Analogously, for the blog, the top locations were *at home* (10), *on holiday* (4), *outside* (3), *at a café/bar/restaurant* (3). The most frequent social contexts were *alone* (10), *family* (3), and *partner* (3). The most frequent activities preceding reading the blog were *working* (7), *relaxing* (6), and *eating* (4). Other contexts were mentioned two or fewer times.

7.6 Recall

For most recall questions, the vast majority of people were able to give the right answer – regardless of the view used. Only few questions showed considerable differences between views. For example, *Q7 (software developer)* asked *"Michael studied computer science at TUM, Munich."* Here, most blog users gave the correct answer (no), while most chat users said they did not know. A possible explanation based on our interviews is that this question asked about the persona's professional background, which was more prominently perceived as part of the interview in the blog entry, compared to the persona description in the chat view. In contrast, for example, *Q4 (product manager)* stated *"Planning and executing sprints is a main part of Sophie's job."* and was much easier to answer correctly for

chat users than blog users. A possible explanation is that this question asked about specific reoccurring activities, which appeared more prominently in the chat messages than the blog interview. In summary, these results indicate good overall recall for both views, with differences for questions that asked more about background or activities, respectively.

7.7 Qualitative Feedback

The post-questionnaire included two open questions about the benefits and drawbacks of the blog and the chat: In the first question, we asked the participants for a direct comparison of both methods. In the second one, we wanted to know why the participant preferred blog or chat (in case they had a clear overall preference). After finishing the study, we invited all participants to take part in an optional semi-structured interview. We particularly encouraged those who felt like the questionnaire was not detailed enough to represent their whole opinion on the presented methods. Eight participants (two from each user group) volunteered for the interviews. The following paragraphs provide a summary of the advantages and disadvantages described by the 17 participants in the post-questionnaire, supported by statements from the eight interviews. It also includes their suggestions for improvement of both methods.

7.7.1 Benefits and Drawbacks of the Blog. Users generally valued the blog's clear information presentation: Seven people named the advantage that the information was given all at once. The blog's content was described as clearly arranged (seven people), providing more compact information (five people): "I think the blog can cover the topic more concisely." (A1). Further advantages, mentioned by three participants each, were (1) that the information can better be adapted to the reader's needs, (2) that the user is more flexible when to read the blog, and (3) that the content was easier to follow and understand. Two users stated that the blog was more extensive.

The most frequently mentioned disadvantage of the blog was the lack of information on daily work routines (five people). Three people stated that they felt farther away from the blog's author, leading to a less personal impression. Two out of those criticized that the blog only presented the positive aspects of the job (A1) and that the "nice little details" were missing (D2). Further three

users found that reading the blog was more time-consuming. Two participants disliked that the blog was presented all at once as a "wall of text" and another two mentioned that the blog was static.

7.7.2 Benefits and Drawbacks of the Chat. Regarding the chat, nine participants liked that it gave them concrete information on the persona's daily work routine: Five out of those nine specifically mentioned that the timestamps helped them to understand task duration. Three participants stated in the interview that they were able to draw a line to their own daily routine. All of them were working in student jobs while participating in the study. One interviewed person said she compared the tasks to a friend's working routine, who was employed as a software developer. Seven participants named the advantage of getting short messages bit by bit over the course of the day/week: "I liked that I was not confronted with a wall of text all at once." (D2). Users' statements included that this was leading to a less time-consuming experience (D2), requiring less attention (D1), and low cost and effort (D4). Six users perceived the presented information as more realistic and honest, leading to a closer, more personal impression of the job: "Michael directly reported what he was doing at the moment. The messages therefore seemed honest. Regarding Sophie, I did not know if she wanted to present her job in the best possible way or if she only was reporting facts [when writing the blog]." (A2).

According to seven users, the chat's main drawback was the waiting time between the messages, making it harder to follow the content for five of them. Three people stated that there were too many notifications, all of them being in user group A or D, i.e., receiving the software developer's messages. Two users, also in one of these groups, stated that they read the chat messages with less attention than the blog. Participant B2 criticized that not every message contained relevant information and user B1 stated that the chat felt automated due to "clean" timestamps, e.g., 10:00 or 10:30.

7.7.3 Suggestions for Improvement. We extracted suggestions for improvement from the open-ended questions and interviews. The majority did not comment on the blog, indicating that they were familiar with this presentation type. B2 underlined this assumption in the interview by stating that the blog "wasn't the new thing". Two people made minor comments on the blog's UI. They proposed a table of contents and one of them mentioned accordion elements for folding answers in and out. One user suggested enriching the blog entry with pictures and video material.

For the chat view, three people proposed summaries to facilitate keeping up with the content. Two of them suggested daily, the other one weekly recaps. Three users mentioned that they would have liked to actively communicate with the persona by asking questions. One participant, who was not interested in the messages about the start/end of the workday or breaks, recommended displaying an "online and offline"-mode for the persona, indicating if they were currently working or not. Moreover, one user proposed to make the content adaptive, i.e., classify the chat messages and add a function to subscribe to different topics. Similarly, another participant suggested structuring the content with the help of keywords and to add a search function. Finally, five of the participants suggested combining both views: The blog entry could be used as a first overview and help the users select interesting jobs they would like to follow through the chat messages.

8 DISCUSSION

Overall, both chat and blog were usable and enabled people to learn about the jobs. Our novel concept of scheduled information presentation adds the benefit of enabling users to closely experience temporal processes and routines.

Next, we first discuss the chat message concept (RQ1), followed by design implications considering both blog and messages (RQ2), and future work.

8.1 Perception of Career Options via Chat Messages (RQ1)

Our main findings for RQ1 are that the message concept (1) was well-accepted by users, (2) facilitated getting an impression of daily work routines, and (3) supported participants' informed opinion-making about the presented jobs.

8.1.1 The Scheduled Chat Message Concept was Accepted. Results show that our concept of scheduled chat messages was well-accepted: People read the messages in the app several times a day, as indicated by usage data and questionnaires. They received the information in varying contexts of their everyday life, such as at home, at work, and on the go, shown by the ESM results. Receiving messages over a week was perceived as more time-consuming – yet also more enjoyable and exciting – than reading a blog entry on a single day. People overall found the messages interesting and engaged with the information throughout the week, as shown by subjective feedback, recall results, and interviews.

8.1.2 The Chat View Facilitates Impression of Routines. The chat concept was seen as particularly useful for getting a realistic impression of the professionals' work routines, as shown by questionnaires and interviews. Users positively commented on the messages' timestamps, helping them to understand task duration. Our results imply that the main benefit of scheduled information presentation is that users get a better "feeling" of the data and related temporal processes.

Usage data and ESM results indicate that people read messages throughout their own daily routine, giving them a chance to connect the two. In more detail, linking the personas' activities to one's own routine turned out to vary between individuals: Making a connection was mainly possible when the routines were similar, for example when participants were working in a student job. We conclude that the chat concept may especially be beneficial when users can relate their own current schedule to the presented tasks and routines. Future work could study other target groups with more structured own routines, such as people planning a change in their career.

8.1.3 Scheduled Chat Messages Support Informed Opinion-Making. The scheduled chat messages achieved the desired objective of conveying information on specific jobs. This was shown by self-reported Likert ratings as well as recall questions. People rated their knowledge of the presented professions significantly higher after using the app. This effect was about equal for both chat and blog views. Split by profession, we could only observe a significant increase in the perceived knowledge of the Product Manager's job, presumably due to the participants' low knowledge level before the

study. We assume that in real-life settings, users would have more jobs to choose from and would be more likely to subscribe to jobs they actually want to know more about, enhancing the intended information gain.

Moreover, using the app supported users in deciding whether they could imagine themselves working in the presented professions: The chat view reduced the number of neutral ratings from 10 to 4. This positive effect was also represented in the Likert ratings on the ability to judge one's personal fit for the job.

Overall, our results indicate that the chat view supports career-related opinion-making by increasing users' knowledge and ability to judge their personal fit for the presented professions. We thus conclude that scheduled mobile chat messages from a persona's perspective are a viable way of conveying career guidance information to students.

8.2 Design Implications for Mobile Career Guidance Apps and Beyond (RQ2)

We believe that our lessons learned can inform the design of mobile career guidance in particular, yet also similar applications with scheduled information (e.g., teaching the chronological order of historical events or biological processes like cell division rates or population growth). Based on our results and experiences we thus derived the following design recommendations:

- Use scheduled presentation (here: messages) to convey information on routines and chronological data.
- Use scheduled presentation to emphasize a realistic impression and allow users to "closely experience" the data.
- When using scheduled presentation, consider providing summaries to facilitate keeping up with the content over time.
- Present information all at once (here: blog) to shape a first impression, provide an overview, and/or establish background information.
- Consider using a combination of both approaches, e.g., via a "subscription" model, that is, information upfront as an entry point for deciding on subscribing to further details via scheduled information.
- Bear in mind that scheduled presentation introduces new design dimensions, in particular for content creation: Who creates the schedule and content? With which instructions? What is a suitable length and amount of chunks in a specific context?
- Consider reusing known UI concepts for scheduled presentation, e.g., messages, news tickers, or notifications.
- Take into account the target user group's likely own routines for scheduling information, if possible, to make it more relatable and facilitate drawing comparisons.

8.3 Opportunities for Adaptation (RQ2)

While the majority agreed on the general benefits of scheduled messages for career guidance, they showed individual preferences regarding number, content, and detail of messages. Qualitative feedback indicates that the optimal number of messages per day is highly individual: It depended not only on users' prior knowledge but also on the context in which they received the messages and the available time to engage with them.

The preferred content also varied: Some participants valued including details on side tasks, whereas others were only interested in work-related tasks. We conclude that the chat-based presentation lends itself to personalization with content adapted to personal preferences. Suggestions in the interviews included classifying the messages among topics with filters that could be switched on and off. People also suggested providing a recap of the day and week to help them keep track of what happens, even when they do not always have the time or interest to follow every message.

To further integrate the app into users' daily lives, future work could investigate "opportune moments" to provide the content, as, for example, explored by Dingler et al. for the use case of mobile micro-learning [7].

8.4 Future Work

Future work could investigate different age groups, e.g., (1) a younger audience (e.g., high school students) and (2) people with a more structured routine (e.g., professionals seeking a career change). Our results indicate that the second group might benefit from the messages even more, as they might make direct comparisons to their own work routine.

We think it is important for career guidance to support self-reflection processes. In the future, we could not only deliver information in a temporal context but also prompt the user with short self-assessments and reflection tasks. Here, we see great potential in delivering content bit by bit, which may leave space for reflection and opinion-making.

Our results show that content should be relevant and exciting to keep engagement. Future work could investigate more interactive UIs, e.g., using a chatbot. Users could thereby ask for details on demand to adapt the content to their needs.

Besides the application's use for career guidance, we see great opportunities for delivering bits of information over time in other fields like mobile learning. Our method could, for example, be used to give learners a feeling of the duration of the earth's geological periods in an accelerated form or teach the life cycle of plants.

9 CONCLUSION

In this work, we explored the use of scheduled mobile chat messages for career guidance. We implemented a smartphone app, enabling users to remotely obtain an impression of the work routine of different jobs. Our app sends the user scheduled chat messages about the concrete momentary tasks of a persona, based on information recorded by a real working professional. Results of a pre-study ($N = 6$) and a field study ($N = 17$) showed that the message-based concept was well-accepted by the participants. Scheduled information presentation gave users a better understanding of concrete tasks and routines. Getting chunks of information in a temporal context also supported a close experience of the content, leading to a more authentic impression compared to a traditional blog entry. Users showed individual preferences regarding content and level of detail of messages, leading to opportunities for adaptive features.

Choosing a career is one of the most important life decisions and likely not one made in a single day, nor with a single approach. We have explored a new addition to the decision-maker's toolset, namely a smartphone app that provides valuable insights into a

profession as small nuggets of information over time. Considering the wider view of possible approaches for gathering career information, our tool particularly adds insights into the actual routine and day-to-day activities of a professional's working life. Looking ahead, with our design considerations and study insights we hope to inform and inspire research and design of future mobile career guidance systems and other learning applications that can benefit from the concept of scheduled information presentation.

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