

1      **More Than Tracking: Understanding Phenomenon and Practice of Chat-based**  
2      **Supervision Service**  
3

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6      Changing behavior is hard and often fails, individuals are constantly seeking new tools to help them develop self-discipline. This  
7      paper reports a mixed-methods study about Chat-based Supervision Services (CSS), an emerging gig economy in China that aims to  
8      assist people in achieving better task completion and behavior change. Findings reveal the motivations and practices of clients and  
9      supervisors. We identify three key practices of CSS that promote behavior change: task reminders and tracking at the core, experience-  
10     based information support and emotional support as secondary support, and flexibility and personalization as key factors. We also  
11     explored the multiple social roles of supervisors in CSS. We discuss the design implications for persuasive technology, behavior  
12     change and gig economy broadly.  
13

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18

19     **1 INTRODUCTION**  
20

21     Anna cannot even recognize herself because she has changed so drastically in the past two months. She is able to  
22     balance a full-time job with an excellent GRE<sup>1</sup> score. From a chaotic daily schedule to a well-organized one, from  
23     extreme procrastination to excellent time management, Anna has done it! She now especially wants to hug the person  
24     she had never met but had always accompanied her! Yes, for only \$ 2.5 per day, you can get someone who encourages  
25     and pushes you to succeed!  
26

27     A unique set of services that have been emerging in China, i.e., chat-based supervision services (CSS), enable *clients*  
28     (i.e., buyer of supervision service) to find *supervisors* (i.e., provider of supervision service) over the Internet to help  
29     them be more self-disciplined and get things done.  
30

31     CSS provides a remote, flexible and personalized service designed to facilitate behavior change, task completion or  
32     self-discipline. Although the HCI and CSCW studies have identified social factors [50, 83, 88] are important in behavior  
33     change and self-discipline, it is under-explored in HCI why clients are using such services to change behavior and how  
34     the use of such services influences their behaviors. By studying emerging user behaviors on CSS, the community can  
35     develop a deeper understanding of users' needs in terms of behavior change and task completion and how these needs  
36     may or may not be addressed by gig economy. Such knowledge can be seen as a practice to enrich behavior change  
37     theories and may lead to the design of better persuasive technology for behavior change. We are thus interested in the  
38     following research questions:  
39

40     **RQ1: What motivates people to hire or to become supervisors?**  
41

42     **RQ2: What are the practices and interactions between clients and supervisors?**  
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44     <sup>1</sup>Graduate Record Examinations, GRE is an important step in the graduate school or business school application process.

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53           **RQ3: What are the factors contributing to support in task completion and behavior change?**

54  
55           We conducted a mixed-methods study that included an analysis of user reviews (N = 792) and interviews (N = 21)  
56           with those who had experience with CSS, including clients and supervisors. We revealed that clients need supervisors  
57           when they are left alone to deal with something challenging and presented four main scenarios and key motivations.  
58           In addition to the flexibility of the job, the additional benefits of the work motivate supervisors to engage with CSS.  
59           In the process of CSS, we identified three key practices: task reminders and tracking, experience-based information  
60           support, and emotional support. Both information support and emotional support were provided to aid the client in  
61           completing their tasks successfully. We also learned that clients' perception of CSS that: social role, personalizing, and  
62           the balance of motivation and pressure make them willing to adopt CSS.  
63  
64

65           Insights from our qualitative study on CSS can provide important research and design implications. First, we discuss  
66           several key practices and factors of CSS, which helps to guide better design in persuasive technology. Further, we show  
67           that supervisors can take on different roles (e.g., teacher, sister, partner) when performing tasks with different purposes,  
68           and explores its design implications into persuasive technology and behavior change. We conclude by discussing the  
69           nature of supervisors and design implications for gig economy.  
70  
71

## 72           2 BACKGROUND AND RELATED WORK

### 73           2.1 Context of the Research: Chat-Based Supervision Service in China

74  
75           On March 24, 2021, the topic of "self-discipline supervisors" sparked discussions on Chinese social media, with a reading  
76           volume of 60.07 million [2]. Since 2015, the first batch of online stores offering supervision services has appeared.  
77           The industry has developed from the beginning with few relevant online stores, irregular pricing, small client volume,  
78           and a personalized mode of supervision services to the industry has taken shape in recent years, with a variety of types  
79           and forms of supervision. [4].  
80  
81

82           The rise of the supervisor profession is closely related to the intensification of "involution" in the Chinese Internet  
83           context [1] and people's pursuit for a better and more efficient way of life [4]. Take Zhihu, a popular forum in China as  
84           an example, "involution" often uses competition for higher education and jobs as examples of fierce competition within  
85           society. Each year in China, thousands of people spend several months, or even a year, preparing for competitive exams  
86           such as postgraduate admissions and civil service exams in order to secure their desired school or job. According to  
87           a Chinese graduate student enrollment survey report, the number of applicants for postgraduate exams in China in  
88           2022 has reached 4.57 million [3]. With the outbreak of COVID-19 pandemic, online office and home isolation have  
89           accelerated the development of the new profession of supervisor.  
90  
91

92           Supervision services can provide clients with support and guidance for a wide range of tasks that may be difficult  
93           or that one may have trouble forming a habit on their own. Clients can choose their supervision goals (postgraduate  
94           admissions exams, IELTS or TOEFL tests, weight loss, etc.), the duration of supervision, and other preferences. The  
95           client's requirements will be matched with the appropriate supervisor by the customer service of the store on Taobao.  
96           Figure 1 shows a collection of prices for different type of supervision services in a store, ranging from about \$ 2.5 to  
97           \$ 6 per day depending on the targeted supervision items. During the supervision process, the supervisor will remind  
98           and supervise the client according to the plan previously determined with the client via text, voice, video conference  
99           (e.g. Tencent conference), and ask the client to provide proof of completion of the plan. Additionally, the supervisor  
100           will make feasible suggestions and plans according to the client's status, review the plan implementation periodically,  
101           as well as communicate and encourage, so as to achieve the desired effect of supervision.  
102  
103



Fig. 1. Screenshot of a shop selling CSS: (a) Results for: Supervision Keywords; (b)Details page of CSS; (c)Purchase options in the purchase page

## 2.2 Persuasive Technology and Behavior Change

2.2.1 *Persuasive technology and Behavior change.* In HCI and CSCW, a body of research has long focused on examining how technology can be used to influence people's attitudes and behaviors, forming the field of persuasive technology (PT) [32]. The most common areas of persuasive technology application are in health and wellness [57, 85]. However, while literature on exists in other areas such as education [46, 99], environmental protection [55, 73] and daily habits [87], it is still understudied compare to health and wellness. PT is generally done by using *persuasive strategies*, which are methods designed to persuade the user to alter their behavior and also related to a series of *behavior change theory*. *Behavior change theory* is well studied in behavioral and social psychology. A review of the literature by Davis et al. [24] identified 82 behavioral change theories that are applicable to individuals. Related theories include Goal-Setting Theory [66], Cognitive Dissonance Theory [30], Self-Determination Theory [25], Social Influence Theory [53]. There are many *persuasive strategies* listed in the extant literature. For example, according to Fogg [31], seven strategy tools are commonly used in persuasive technology tools: reduction, tunneling, tailoring (customization), suggestion, self-monitoring, surveillance, and conditioning (reinforcing).

2.2.2 *Social Support, Social role & Personalization in PT.* *Social support* is an important strategy that helps people cope with uncertainty situation and foster a sense of control in one's life through communication with providers [5]. It has been categorized in different types like emotional, tangible, informational, network and esteem support [22, 90]. Social support mechanisms has been suggested to be used as an effective way to persuade people to establish healthy behaviors [52], including several strategies that can be applied as persuasive principles in behavior change, such as cooperation, competition, social learning, social facilitation, etc [82]. Due to the rapid advance of remote

157 communication technologies, online social support has been widely used in behavior change interventions. Studies  
158 have shown that social relationships, including forms of social networks, social awareness, and social norms, play  
159 a key role in behavior change [6, 11, 93]. The HCI and CSCW are also drawing on theories about social support  
160 for research. Study With Me (SWM) videos [61], for example, viewers get controllable peer pressure and emotional  
161 support by watching SWM videos to create a learning atmosphere and improve learning efficiency when studying  
162 alone at home. *Social role* is a persuasive strategy by Oinas-Kukkonen et al [75] in the Persuasive Systems Design (PSD)  
163 model proposed that helps people keep moving towards their goal or target behavior in computer-human dialogue. This  
164 popular strategy is often implemented as an interactive live chat feature [77] used by expert [94] or companion [54]  
165 and other roles to provide advice and support to the user through the behaviour change process. In HCI applications,  
166 social role implementation includes chat with human or non-human (e.g., virtual agents or chatbots). In physical health,  
167 QuityLink [79] uses online counselors as a way for users to seek smoking cessation counseling. E-health application  
168 has a virtual specialist to promote healthy diet and exercise of patients [94] the role of collaborator or competitor  
169 is also often used to encourage healthy behavior change [18, 20, 27]. For example, in improving mental health, an  
170 animated character as a game partner is applied to the application to prevention and early intervention of childhood  
171 anxiety [80]. And artificial learning companion designed improve learning attitude and make learning more effective  
172 when it used in the education areas [54]. In addition, McMillan et al. have proposed that more variety of roles should  
173 be designed for Conversational User Interfaces (CUI) instead of being limited to traditional roles such as butler and  
174 maid [69]. Social role strategy can increase users' perceived persuasiveness [77], as well as build relatedness [13], reduce  
175 loneliness, enhance comfort through companionship, promote behavior persistence, and increase the effectiveness  
176 of behavior change [54]. Social interaction brought about by social role plays a crucial role in the formation of an  
177 intrinsic cognitive structure, and can help users overcome motivational deficits by encouraging and enhancing their  
178 attitudes [54]. *Personalization* means system offers system-tailored contents and services based on the user's needs and  
179 characteristics. The persuasive research community is aware of the potential of personalization. Oyebode et al [78]  
180 combine SoC theory with motivation theory and the persuasive systems design model to develop practical guidelines  
181 to inform the tailoring of persuasive systems. Orji et al [76] design guidelines for persuasive systems can be tailored  
182 to individuals of various personality traits.  
183  
184

### 185 2.3 Gig Economy and On-demand work

186 2.3.1 *Gig economy*. There is a lot of research about gig economy in the field of HCI and CSCW. Relevant cases  
187 include Paid Game Teammates[91], Uber Drivers[81], beauty workers on on-demand home service platforms[9], native  
188 speakers as tutors for temporary jobs on online language tutoring platforms[106], etc. Gig workers do not have fixed  
189 working hours and locations as well as employers, and the information on the supply and demand sides are directly  
190 transmitted through the Internet in a timely manner[100].  
191

192 The emergence of the gig economy has brought lots of potential benefits, including increased earnings, career flexi-  
193 bility, skill development, etc. Flexibility means that gig workers can set their own rates, choose the type of work they  
194 want to do[48] and break free from rigid schedules and bureaucratic traditional work environments[39, 64, 72]. It also  
195 creates opportunities for people with caring responsibilities and disabilities to work online[19, 39, 40]. Another benefit  
196 is that through a platform marketplace with diverse project opportunities, gig workers may explore new career oppor-  
197 tunities[7, 12] and gain potential avenues to try out new skills or get skill development[12]. There are some problems  
198 with the gig economy. Autonomy paradox[92] is a phenomenon in that flexibility may result in a lack of boundaries  
199 between work and personal time[42]. Gig workers cannot efficiently self-manage resources. For example, gig workers  
200

must actively conduct additional skill training and invest time in finding jobs to work in different occupations or platforms[56], as well as coordinating time resources, improving productivity, advertising themselves, and maintaining client relationships[97]. A serious problem is that gig workers may face professional isolation and atomization over the long term[107], which limits the opportunities to obtain social support[56] and relevant information from their peers, thereby increasing information asymmetry[47, 101]. Other issues include unstable income and low security for gig workers[49], and the potential for new privacy concerns[36, 89].

Studying the emerging gig economy brings updates and refinements to the theory of HCI and CSCW, and provides design guidelines for the future. Researchers propose strategies to help gig workers improve productivity. For example, designers need to consider mechanisms to help workers stay focused and tasked and help gig workers quickly extract requirements through natural-language processing (NLP) methods, making information more readable, as well as designing tools to remind and motivate workers[42]. Greater autonomy is also a direction for the future of design, such as enhancing autonomy by expanding workers' reputation and exposure opportunities, and considering more democratic algorithm matching mechanisms[58, 108]. Fostering meaningful peer support is also an important element, not only to improve information support, but also to build emotional bonds[107]. Future research should explore the configuration of supportive communities[7], and consider strategies to mitigate destructive competition. On the issue of power distribution and balance, transparency should be improved in future algorithm work to reduce information asymmetry[35, 108] and the algorithm matching mechanism should distribute the power dynamics more evenly[7].

2.3.2 *On-demand work.* On-demand work is defined as short-term work that found or matched via digital platforms [44], which is often discussed by gig economy research. It involves a wide range of work tasks, including traditional working activities offered and assigned through mobile apps, such as driving [17, 37, 51], cleaning and running errands [95]. And it also includes a variety of knowledge work [103], such as software development, design, etc., and even some emerging jobs such as paid game teammates [91]. On-demand work can be broadly classified into microtasks and macrotasks. Microtasks are shorter in duration and are often described as fragmented and skilled [63], such as image tagging and audio transcription on the Amazon Mechanical Turk platform. Macrotasks which are more related to our work tend to be more complex and knowledge-intensive projects executed over a longer period of time [34], and the quality of the work is often subjectively assessed by the client. In recent years, on-demand work has developed rapidly. According to McKinsey estimates, by 2025 [68], the on-demand economy will account for 2% of global GDP. Related studies [33, 41, 74] predict that the “on-demand” economy business will become “the future of work”. As an emerging online, flexible profession, supervisors can remotely provide on-demand CSS for clients who require self-discipline.

Previous studies on on-demand work has focused on the relationship between platforms and freelance workers. For example, the contradiction between workers' need for autonomy and platforms' need for control [65, 105] and the algorithmic mechanism of the platform [16]. HCI and CSCW have provided a series of recommendations for the design of platforms for on-demand work in terms of workers' welfare, such as democratically developing algorithmic features [8, 60, 109], designing tools to motivate workers to submit more bids [43], promoting fair reviews in gig markets by expanding workers' reputation and exposure [8], etc. These studies provide important insights for our work.

Our research focuses more on the relationship and interaction between workers and clients. Lustig et al [67] discuss the challenges of working with on-demand worker from the client's perspective and Muralidhar et al [45] reveal how the work is accomplished in terms of the needs, experiences and reasoning of freelancers in relation to matching, interacting, and collaborating with clients. In on-demand work, workers' work is task-oriented, and the ‘task-oriented’

means that labor relations are increasingly transaction-based [29], which means that the worker's relationship with the client is primarily as a task performer serving the client's needs. Both the client and the worker have to put in a lot of time and work to figure out if the other is a good fit, especially in the complex macrotasks [34, 45, 104]. In macrotasks, the quality of the worker's work is often subjectively assessed by the client, which can potentially affect the worker's reputation system [59, 86].

### 3 METHODS

To answer our research questions, we conducted a mixed-methods study. The study had two complementary components. A qualitative analysis of user reviews assisted us in obtaining a comprehensive portrait of the chat-based supervision service industry, and interviews were used to gain a deeper understanding of chat-based supervision services.

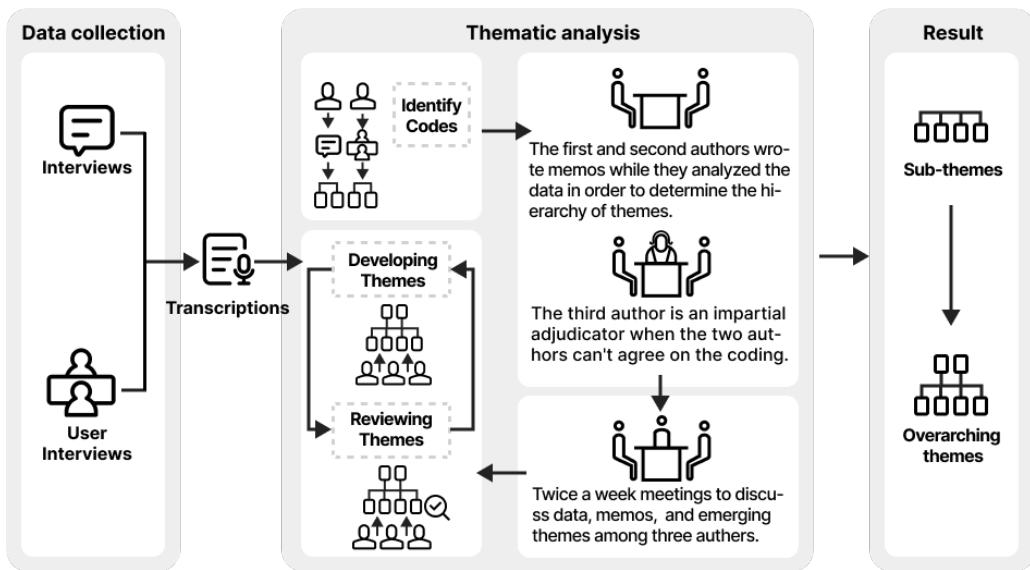


Fig. 2. Research method overview

#### 3.1 Data Collection of User Reviews

Inspired by research methods for sampling and analyzing user reviews in the fields of CSCW and HCI [14, 26, 28, 70], we argue that user reviews can be an effective method for gaining insight into users' perceptions and evaluations of a product or service. We now describe the method for sampling the Taobao stores and for sampling the user reviews. Separate searches were performed using the terms "self-discipline", "supervision service", "overcoming procrastination", "behavior changes", and "habit formation". After removing duplicates, we found 2372 different Taobao stores selling CSS. But quite a few of them hardly succeed in selling services (because of the characteristics of Taobao: the threshold for opening a store is low, and almost everyone can open a store). So, we choose the store that sells CSS based on how much the service sells.

Finally, we chose the top 5 Taobao stores based on the month's sales rankings by search results. The largest and lowest monthly services sales volumes for these stores are 1512 and 466 respectively. The average sales volume for these stores is 686.8 times ( $SD=461.4$ ). The five stores have been open an average of 40 months ( $SD=35.2$ ), with the greatest and shortest periods being over 96 months and 16 months respectively. The score for "item is consistent with the description" in the DSR (Detailed Seller Ratings) dynamic score of the five stores is over 4.8 points (the full score is 5, the higher the score is, the more consistent the goods are with the store description). In addition, the above stores have a variety of supervision services, including both basic supervision services and personalized, customized supervision services, such as study counseling, emotional support, etc. From January to August 2022, the five stores generated a total of 15838 user reviews.

To ensure a representative dataset of user reviews, we filtered the user reviews three times. First of all, we screened 15,838 user reviews, deleted 'invalid reviews for shopping reference'<sup>2</sup>, determined by Taobao platform, and obtained 10456 user reviews. And then, we use Microsoft excel to further filter the 10,456 user reviews: Taobao platform recorded the number of views and 'Helpful'<sup>3</sup> of each review. According to Taobao's mechanism, we selected the reviews (i) with more than 30 words, (ii) considered to be 'Helpful' by 2 or more users, and (iii) with 10 or more views<sup>4</sup>. We removed 2,536 user reviews at this step and left 7,920 in the dataset. Finally, we randomly sampled user reviews by 10% sampling rate, with 792 valid user reviews remaining in the dataset.

### 3.2 Data Collection of Interview

3.2.1 *Recruitment of participants.* To explore our research questions, semi-structured interviews were conducted with 21 participants. For supervisors, we recruited participants via posting recruitment information in online social media such as Weibo and by requesting assistance from Taobao stores to distribute the recruitment information to supervisors' work groups. For clients, snowball sampling was also used to recruit participants.

3.2.2 *Interview Procedure.* The interviews were conducted from May to August 2022 in Mandarin using audio calls. The average interview lasted 40 minutes, and participants received 60 CNY (about \$8.20 USD) as payment for their time. Participants received a consent form that described the purpose of the study, the topics that would be discussed, and the voluntary and confidential nature of participation. The primary focus of the interview questions was on the participants' motivation, perceptions, experience, as well as their concerns they engaged in during CSS.

3.2.3 *Profile of Participants.* Among the 21 participants of interview, 4 are male, 17 are female. The participants age from 18 to 30. The participants include 8 supervisors, 12 clients, and 1 are both supervisors and clients. The participants are all Chinese. Most of them are in economically developed cities in China, and 2 (P13 and P16) are Chinese students studying abroad. The average working time of supervisors is 17.2 months and the average experience time of clients is 4.9 months. Table 1 summarizes the demographic information of the participants.

<sup>2</sup>Taobao platform will filter invalid reviews according to certain dimensions. The user reviews may be considered invalid due to non-standard content or limited reference value. For example, the system default review, blank text content, irrelevant to goods & transaction (meaningless), advertisement, false, copying reviews and similar content, etc.

<sup>3</sup>'Helpful' button is a function for users set by Taobao. Taobao buyers can click the 'Helpful' button if they agree with review. The more the likes, the more other buyers can refer to this review.

<sup>4</sup>The number of views on the review reflect the degree of attention from Taobao buyers.

Table 1. Demographic information of interviewees

ID	Gender	Age	Occupation	Role of CSS	Education (E: expected)	Experience (months)	Field
P1	Female	23	Student	Supervisor	Master (E)	19	Multiple Fields
P2	Female	26	Full-time supervisor (Gap)	Both	Bachelor	26	Multiple Fields
P3	Female	22	Student	Supervisor	Bachelor (E)	12	Multiple Fields
P4	Female	21	Student	Supervisor	Bachelor (E)	24	Multiple Fields
P5	Female	18	Student	Client	High school	3	Study
P6	Female	26	Student	Client	Master (E)	1	Multiple Fields
P7	Female	25	Professional	Client	Bachelor	2	Health
P8	Female	22	Student	Supervisor	Bachelor	12	Multiple Fields
P9	Female	20	Student	Client	Bachelor (E)	3	Study
P10	Male	22	Student	Client	College	2	Study
P11	Female	24	Teacher	Client	Bachelor	2	Study
P12	Female	29	Teacher	Client	Ph.D	3	Multiple Fields
P13	Male	24	Student	Client	Bachelor	9	Multiple Fields
P14	Male	27	Professional	Client	Master	3	Multiple Fields
P15	Female	24	Student	Client	Master(E)	2	Multiple Fields
P16	Female	20	Technition	Client	Bachelor	7	Health
P17	Male	22	Governmental	Supervisor	Bachelor	18	Study
P18	Female	25	Student	Supervisor	Master(E)	12	Multiple Fields
P19	Female	21	Student	Supervisor	Bachelor(E)	18	Multiple Fields
P20	Female	29	Professional	Supervisor	Master	14	Multiple Fields
P21	Female	30	Governmental	Client	Master	1	Study

### 3.3 Thematic analysis

As Figure 2 shows, we used thematic analysis for data analysis [15]. Firstly, the first and second authors separately translated the user reviews and interviews into transcripts. And then, the authors analyzed the transcripts using an open coding method separately and then were combined together [21]. We initially suggested potentially interesting aspects of the code and data, such as: ‘reminder strategies,’ ‘tracking tools,’ ‘goal setting,’ ‘experiential knowledge, ‘emotional interaction,’ and ‘sense of companionship,’ so on.

Realizing that existing data cannot be well described by current codes, we either merged, split, altered, or generated new codes to better explain the data [62] [71] [102] [96]. The first and second authors wrote memos while they analyzed the data in order to determine the hierarchy of themes. The third author was asked to serve as an unbiased arbiter when the two authors disagreed over the coding. Additionally, we met twice a week as a group (including the first, second, and third authors) to discuss data, memos, and emerging themes until we reached an agreement. To address emerging questions that occurred during these meetings, all authors would review the relevant transcripts. And then, we organize the codes into a hierarchy of themes. Representative quotes included in this paper were translated into English. Interviewees were referred to by identification codes that included participant (P) numbers and User Reviews were referred to by identification codes that included User Reviews (UR) numbers, which are used in the Results section to cite quotations. In reporting findings, we have taken steps to ensure the anonymity of all of our participants. In some cases, we have paraphrased to remove potentially identifiable information.

417 **4 FINDINGS**

418 **4.1 Scenarios where clients decided to hire supervisors.**

419 Interviewees and user reviews reported a number of different reasons for hiring supervisors; we identified scenarios  
 420 where consumers hire supervisors and four primary themes of clients' motivations. The themes we identified of clients'  
 421 motivations share a common point worthy of emphasis: clients typically hire supervisors when they want to be more  
 422 efficient or get things done. Therefore, before describing themes, we first describe four scenarios they decided to hire  
 423 supervisors.

424 As shown in Table 2, we identify scenarios that occur more frequently where people hire supervisors, where the  
 425 definitions of the scenarios are not mutually exclusive, for example, preparing for an exam may also be a work-from-  
 426 home scenario.

427 Table 2. Scenarios Where Consumers Hire Supervisors

428 <b>Scenarios (Frequency)</b>	429 <b>Description Examples</b>
430 <b>S1: Preparing for exams</b> (4 in 431 interviewees, 52.7% in the user 432 reviews)	433 Preparing for exams is a fairly common scenario, usually for graduate school entrance exams, civil service entrance examination, vocational exams, and other exams that require the client to determine their own schedule and study content. For example, " <i>I procrastinated a lot, and now I am taking the postgraduate entrance examination. I found a supervisor when I wanted to give up the exam the most</i> "(UR10).
434 <b>S2: Work/Study from home</b> 435 (6 in interviewees, 43.6% in the 436 user reviews)	437 Students work or study at home during the gap year or people who work at home or take classes online because of COVID-19. P14 recalled a time when he had to work from home because of COVID-19. " <i>I was far less motivated to work from home than I was in the office, and when I finally felt like I couldn't put off my work any longer, I asked a supervisor for help.</i> "(P14).
438 <b>S3: Form/Kick a habit</b> (3 in interviewees, 27.3% in the user reviews)	439 Clients usually want to get into the habit of exercising, or the habit of going to bed early and waking up early, or want to kick the habit of cell phone addiction, etc. " <i>I hate exercising, even though I know I should. I used to ask my partner to push me to exercise, but I soon realized it wouldn't work because he spoiled me that I didn't have to do it if I didn't want to. I think I need a more responsible supervisor as a result.</i> "(P7)
440 <b>S4: Self-growth after get off work</b> (2 in interviewees, 10.9% in the user reviews)	441 Changing the once-daily after-work routine to allow for self-discipline and self-growth is also mentioned. " <i>After work, all I want to do is lie in bed and do nothing. I'm too tired to go to work, and when I get home, I just can't keep myself in check.</i> "(P11)

442 **4.2 Motivations for clients and Supervisors**

443 As respondents include both clients and supervisors, the interview data and user reviews provide a lens through which  
 444 to understand both parties that participate in these transactions. A discussion of the motivations reported by clients  
 445 who hire supervisors is provided first, followed by motivations from people who are supervisors.

446 *To overcome procrastination and manage their time.* Clients often spend money on paid supervisors because they  
 447 see these purchases as a way to overcome procrastination and manage their time when they need to get things done.

469 Even though these clients know they should act to get things done and that failure to do so will result in negative  
 470 consequences, it is difficult for them to act on time. UR111, for example, trying various methods but continued to  
 471 procrastinate, e.g., *"I always procrastinate, and I study intermittently. It is inefficient and prevents me from meeting my*  
*472 study schedule. I have attempted every method to overcome procrastination, but none of them work."*(UR111). P3 also failed  
*473 to manage its own time "Before I go to bed, I organize the tasks and schedule for the following day, but I never complete*  
*474 them, and sometimes I play games to avoid my schedule."*(P13).

475  
 476 *To get atmosphere and companionship.* Whether it's preparing for exams, studying or working from home, or accom-  
 477 plishing challenging goals, the motivation, and atmosphere brought by supervisors is valued by the interviewees and  
 478 the user reviews, e.g., *"There is no motivation to prepare for the exam alone at home"*(UR73), *"Without studying together*  
*479 after work, I feel like there's no learning atmosphere"*(P2) and *"When I catch up on graduation projects and theses alone*  
*480 because of the pandemic. I believe that writing a thesis for graduation is too painful. It takes a lot of daily time and effort.*  
*481 I want to find a partner to help me with this activity since it will make me feel a little less unpleasant."*(p6).

482  
 483 *To get help from an experienced person.* Some interviewees and reviews indicated that they tend to seek someone  
 484 with experience in completing their tasks for supervising, but they did not require systematic guidance in the manner  
 485 of a tutor or teacher. They desire autonomy, and the supervisor merely points the way and answers their questions.  
 486 For example, UR42 said *"When I prepared for the unified national legal qualification exam alone at home, I didn't have a*  
*487 plan for the day and didn't know if I had studied well, so I found a supervisor who had passed the exam to supervise my*  
*488 study."*(UR42). P15 wanted a supervisor who had been in the same experience and state of mind as she was experiencing  
 489 now to help her get back on track. *"My relationship ended, but I had to concentrate on my exams. I was unable to*  
*490 concentrate, so I found a supervisor who had successfully recovered from a breakup to supervise my daily study, exam*  
*491 preparation, and daily exercise"*(P15) P10 explained why he chose a supervisor instead of an online tutor, e.g., *"I've had*  
*492 online tutors, but she mostly lectures and can't monitor my practice 24/7. [...] But the main reason for my poor learning is*  
*493 my lack of self-control. Instead of listening to others, it's important to practice and repeat."*(P10).

494  
 495 *To relieve stress and regulate emotions.* Stress and emotional issues were highly mentioned by participants and user  
 496 reviews. After failing the graduate school entrance exam twice, UR53 encountered emotional issues that affected his  
 497 studies, so he had the idea of hiring someone to supervise him, e.g., *"After a second exam failure, my life was extremely*  
*498 decadent, I couldn't sleep every night and wake up very early in the morning. My thoughts are filled with remorse, confusion,*  
*499 and uncertainty about my future. My daily routine is not very chaotic, so I wanted to find a supervisor to supervise me,*  
*500 help me adjust my schedule, and prepare for the third postgraduate entrance examination. "* UR40 felt the supervisor very  
 501 useful in her preparation for the exam by helping her to keep her emotions in a good state, e.g., *"(This is my) second*  
*502 year of CPA (Uniform Certified Public Accountant Examination) preparation! Preparing for multiple subjects is extremely*  
*503 stressful, and I can't relieve my emotions when studying alone. And I get extremely impatient when I finish one course*  
*504 and rush to the next! My anxiety, worry, and other emotional issues are interfering with my studies. I stumbled upon this*  
*505 humane and professional service that allows me to pay attention to my own pace based on my study ability, regulate my*  
*506 best state, and stay efficient!"* P16 said, *"I live alone in Canada, and I'm not a very social person, so I'm often sad and*  
*507 lonely. I often have emotional breakdowns if I don't follow through on plans I've made, like doing my homework tonight*  
*508 or getting up early tomorrow."* (P16).

509  
 510 *4.2.1 Motivations for being hired by clients.* Income is the primary motivation for people to be hired as supervisors.  
 511 Due to the remote nature of the work and the flexibility of the hours, interviewees viewed supervisors as ideal part-  
 512 time employment for supplementing their income. Especially for those who concentrate on preparing for exams (e.g.,  
 513

521 graduate school entrance exams, national civil service exams) during the gap year. As noted by P20, “*Unlike my previous  
522 job, which required a lot of commuting time, I can supervise clients whenever and wherever I want, so I can focus on  
523 preparing for my graduate school entrance exams from home while earning an income by supervising clients.*”(P20)

524 All interviewees indicated that they transitioned from clients to supervisors. When they are clients who hire supervisors,  
525 they see the value of supervisors and want to become one to help others help themselves. For example, when  
526 P1 was a client, she found that the supervisor did help her, and she felt she could have done better if she had been the  
527 supervisor, e.g., “*I hired a supervisor when I was preparing for my national civil service exams. I realized that a supervisor  
528 could really help me do a better job in my study. I could do a good job if I was a supervisor, and then I tried. It turned out  
529 that I could do it well!*”(P1).

530 Some supervisors view the process of supervising others as beneficial to themselves. P3 described the feeling of  
531 being motivated, e.g., “*I have met a lot of wonderful people that I would never have met if I hadn’t been a supervisor, such  
532 as a client who have worked in top Internet companies but want to change careers to pursue his dreams, Chinese student  
533 who are struggling to apply for a Ph.D. in Australia. This feeling is different from the way you feel when you see great  
534 people on social media. As a supervisor, I get to see what great people do every day. I see those smart people also work hard,  
535 and that makes me want to learn more.*” P4 expresses how being a supervisor is actually a process that allows her to  
536 discipline herself, e.g., “*My client is someone who has a particularly good routine. She goes to bed early, wakes up early,  
537 exercises every day and memorises words every day. When I supervised her, I also started to go to bed early and wake up  
538 early, and it was a great feeling.*”(P4).

#### 544 4.3 Matching Supervisors and Making Transactions

545 4.3.1 *Process of Matching Supervisors.* When a client goes to a store to buy a service, client service will first figure out  
546 what the client’s basic needs are, like the supervisor’s qualities (such as education, professional background, and person-  
547 ality), the type of supervision service (such as whether coaching is required), and the duration and style of supervision  
548 (strict, relaxed, etc.) Typically, client service sends the client’s needs directly to the group chat of already-employed  
549 supervisors; supervisors will evaluate whether they meet needs and then contact client service. As mentioned in P2,  
550 the supervisor’s own professionalism is important in this matching mechanism, e.g., “*Due to the fact that they are all  
551 part-time, we can only rely on the supervisors’ initiative to take orders, and because the client’s needs are sometimes ex-  
552 pressed in great detail, the extent to which they can meet the client’s needs depends solely on the supervisors’ discretion.  
553 It is difficult for us to monitor; we only record the supervisors’ basic information, length of service, and positive feedback  
554 rate.*”(P2) Before beginning formal supervision, the supervisor will gain a deeper understanding of the client’s situation,  
555 P1, for example, “*When I take an order, I spend the first three days getting to know the client so that I can work with  
556 them effectively in the future. However, if you are a new supervisor, you must spend a great deal of time with the client on  
557 your first day in order to understand his preference.*”(P1) This matching process often requires the active participation  
558 of the clients in communication, and as P2 said, “*it will be difficult to implement if the client refuses to communicate in  
559 the first place.*” For some supervisors, the supervision service is actually a two-way selection process; the supervisor  
560 can choose the client, too. For example, “*After that, I supervise only early-to-bed, early-to-rise clients.*”(P1) and “*I only  
561 take emotionally stable clients who need supervised learning.*”(P8)

562 4.3.2 *Personality acting and actual professional experience.* When matching supervisors, clients frequently consider  
563 their professional skills and personality traits. For some supervisors, there are a variety of personality traits requested  
564 by clients that they can almost always meet - through personality-acting. For example, P19, e.g., “*Speaking skills can  
565*

573 *meet the diverse personality requirements of users. In my everyday life, I am a serious individual. If a client desires a lively*  
 574 *supervisor, I can adapt my communication skills accordingly.”(P19). P17 said that a personality that the client likes can*  
 575 *be performed, but expertise cannot. “Because I mainly supervise civil service exams. Some clients are very interesting,*  
 576 *and they ask for a supervisor to be gentle, cheerful, optimistic, and so on. I usually take orders without considering their*  
 577 *personality needs because with a little attention to the way I speak, I perform to achieve the personality they need.” P2*  
 578 *pointed out that in managing her own Taobao shop, the supervisor generally does not verify other aspects as long*  
 579 *as they are consistent with the client in terms of professional experience. “Because the client can identify at a glance*  
 580 *that there is only professional experience. Personality, responsibility, these can’t be measured and judged, so they can only*  
 581 *match professional related ones.”*

#### 585 4.4 Tasks Reminder and Track

586 Reminding and tracking of tasks is the most important part of the supervisors’ work. Clients will send their tasks or  
 587 next day’s schedule to the supervisor via instant messaging(IM) apps(e.g WeChat), and the supervisor will remind and  
 588 track the completion of the client’s tasks within the time requested by the client.  
 589

590 **4.4.1 Flexibility of Reminder Time.** Following the client’s schedule and reminding the client on time is a fundamental  
 591 requirement for the supervisor. P11 said that timely reminders assist him in developing a regular life schedule, e.g,  
 592 “*During that time, I was busy at work so I didn’t want to study when I got home, but the supervisor kept reminding me*  
 593 *at the agreed-upon time, sending messages, calling, etc. I often felt guilty if I didn’t study after he had pushed me many*  
 594 *times, therefore, after being reminded often, I started studying regularly.”(P3). If the supervisor fails to complete the*  
 595 *aforementioned tasks on time, it indicates that the supervisor has committed a serious breach of duty and risks being*  
 596 *complained about by the client; for example, p3 mentioned the risk of being fired by the store for failing to remind*  
 597 *on time, e.g, “*If there are multiple reminders of inaccuracy, the store will dismiss him”(P3).* In addition to reminding at*  
 598 *the agreed upon time, supervisors are skilled at identifying the moments when clients stray from tasks. P8 explains*  
 599 *how she astutely assesses a client’s propensity to abandon tasks by examining the timing and content of the client’s*  
 600 *tasks “*If a client was able to complete 6 - 7 pages of PPT before, and only two pages were completed this time, and the**

601 *content of the PPT did not become more complicated.I will increase the frequency of reminders in her next work.”(P8).P20*  
 602 *summarized people’s concentration time from his own work experience,e.g, “*Most people’s concentration time is often**

603 *35-45 minutes, and then the concentration time of students who need to listen to online classes can often be 60-80 minutes.*

604 *If the reminder interval is too short, it will disrupt their work rhythm.”(P20). P21 said she would increase the frequency of*

605 *reminding clients based on her own experience,e.g, “*when losing weight, the more you go into the evening, the more you**

606 *actually want to eat, so I would increase the frequency of reminders at night often asking my clients what they are doing*

607 *and how they feel, reminding her that we have to persevere, so she can control her appetite.” P15 expressed her gratitude*

608 *to the supervisor for taking the initiative to remind her, e.g, “*I was sad so I couldn’t focus, and the supervisor reminded**

609 *me every half hour, talked to me about my current mood, comforted and encouraged me, so I could pull myself together*

610 *and continue with my schedule.”*

611 **4.4.2 Personalizing Usage of Tracking Strategies and Tools .** Supervisors track clients primarily through instant  
 612 messaging(IM) apps and other assistive tools. Both asynchronous and real-time methods are available. According to our  
 613 interviewees, the asynchronous approach is the most common use: through IM, the client sends information to the  
 614 supervisor that reflects the completion of tasks, an act known as “*Daka*” in Chinese. P5 said the way of *Daka* to the  
 615 supervisor is very user-friendly,e.g, “*After completing a task, I always report to my supervisor. Because after Daka, the*

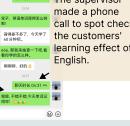
Supervision Types	Supervision Tools	Tools usage	Supervision scenario
Real time supervision Mainly based on video supervision	Online meeting tools E.g. Zoom, Tencent Meeting  	Video conference, voice conference, screen sharing, file transfer, etc.	For example, when the client turns on the camera, the supervisor monitors the customer's learning behavior in real time and gives feedback in time.  The client use the camera to focus on their hands and computer screen rather than anything unrelated to learning.
Real time supervision Mainly based on video supervision	live streaming platform E.g. YouTube, BiliBili, custudy  	support streaming video from a single or group of individuals.	For instance, the client broadcasts his own learning activities to the audience. As an audience, the supervisor will give feedback in real time according to the performance of clients.  On BiliBili, many users choose to broadcast their learning process online.
Real time supervision Mainly based on Remotely control	The Remote Desktop Software E.g. TeamViewer 	Remotely control clients' computers, mobile phones or other devices.	In order to forcibly intervene the addictive behavior of customers, such as playing games for a long time. Therefore, under the authorization of the client, the supervisor remotely controls the client's computer. 
Asynchronous supervision Mainly based on DaKa	Daily device usage tools E.g. screen time 	Record the total screen time of the client and the screen time of each application.	For instance, The supervisor checks the screen time of the client to see whether the client is focused on learning rather than playing with their phone.  The supervisor asked the client to send the screen time of his mobile to him.   The client was sorry for his behavior and decided to spend less time on playing mobile phones.
Asynchronous supervision Mainly based on DaKa	Scheduling Tools E.g. Calendar 	Record the schedule, set reminders of to-do items, etc.	For instance, the client uses the schedule tool to record their own work schedule; or the supervisor reminds the client to start the task on time according to the reminder function of the schedule tool.  The client sent her daily arrangement to supervisor.
Asynchronous supervision Mainly based on DaKa	Pomodoro timer apps E.g. Forest, Focus To-Do 	Task management, timing, track user's time with detailed statistic, mandatory reminder, etc.	For example, the client shares her focused period of the day generated by pomodoro timer app to the supervisor, and the supervisor gives advice according to the performance of clients.  The supervisor was satisfied with the client's performance and gave her some suggestion.
Asynchronous supervision Mainly based on DaKa	Voice communication tools E.g. Social software, Meeting tool 	Provide voice communication services.	For example, Supervisor will spot check the learning effect of clients through voice communication tools.  The supervisor was satisfied with the spot check's result.

Fig. 3. Auxiliary Tools Used in CSS

supervisor will praise me, making me happier. I can take a 10-minute break and chat with my supervisor about something else, which can help me do my next job better. The feed-backs of time recording apps are uninteresting and frigid."(P5).

In chat-based asynchronous tracking, the supervisor also uses many other tools to assist in tracking the completion of the clients' tasks, as seen in Figure 3. Supervisors reported inevitably encountering clients who lie to them during tracking. P2 stated that she was aware that when clients engage, they tend to leave a positive impression and therefore

sometimes may lie, she would carefully examine the client's contents of *Daka* to see whether or not the client is truly committed to the work. Supervisors often request that clients capture screenshots of their screen time statistics, for example, P11, e.g., “*Since I lied to my supervisor and told him the next day that I lied to him the day before: I was actually addicted to TikTok instead of completing the task, he has been checking my screen time every time he tracks my task completion.*”(P11) Supervisors would also advise their clients use self-improvement apps such as Forest, which are used to record focus time. Supervisors will take advantage of self-improvement tools, such as the ability to accurately record and visualize the length of client focus, to improve the effectiveness of tracking. For some learning content, some supervisors may check the completion of tasks through voice spot-checking of knowledge points, for example, UR173, e.g., “*The tension brought by the service of spot-checking knowledge points can be compared to the atmosphere in the examination hall, and I really need to be spot-checked so that I can be motivated to study.*” For clients who are less self-disciplined, the supervisor would use real-time tracking tools. When the client initiates an online meeting, the supervisor determines the client's learning status based on the video feed provided by the client and provides real-time supervisory feedback when the learning status is poor. P3 mentioned that “*video supervision is more expensive but more effective and better suited for clients who lack self-control*”. According to p12, “*online learning under the supervision is boring but very effective*.”

#### 4.5 Experience-based informational support

4.5.1 *Advice about goal setting and planning.* Setting goals and making plans were topics that came up frequently in user reviews and interviews. Some supervisors (P2, P17) stated that a common reason why clients are unable to complete their tasks is because their goals and daily schedules are not properly organized. P2 said, for example, that she can give advice from the point of view of a bystander, which is less affected by emotions. “*Because I am a bystander, I can observe my client's behavior without being influenced by his mental state. For example, a client may be anxious to schedule a full and tight day, which he clearly cannot complete. And it's possible that the sheer volume of work will demotivate him even more. I will then discuss with him the possibility that he will not be able to meet his goal and will assist him in revising his plan for the day.*”(P2) Supervisors also provide assistance to clients based on their own knowledge and experience, such as by assisting them to break down large objectives into smaller ones or by assisting them to prioritize their tasks. P2 explained, “*Most matched supervisors have similar experience to their clients, and we have a library of supervisor work methods (such as how to help clients design a plan) to help them. So the supervisor can give the client some plan and goal insight.*” UR149 felt that his goal adjustments made him less stressed and more focused, “*The supervisor taught me how to divide a large goal into smaller goals so that the pressure to achieve tasks are lessened, and I discovered that with less pressure, I could focus more on the task at hand and (the results) surpass all expectations!*”(UR149) and UR150 also benefited a lot, “*I can't start work because I find it too scary, too long, too much work, and not giving me enough feedback. My supervisor helps me prioritise my tasks in order of importance. Once I gave her my list of things to do, I felt like the world was clear and I could just focus on the small goals in front of me.*”(UR150). P3 said that assisting clients in adjusting their goals and daily schedules benefited both the supervisors and the clients. “*This reduces the stress associated with task reminders and tracks, improves the client's mood, relieves me of emotional labor, and allows the client to trust me more.*” In addition to assisting clients in clarifying their goals and adjusting their schedules, some supervisors have their own internal criteria for judging how well their clients are doing, for example, P2, *I have a client who experiences anxiety and depression. In fact, what I hope to do is to assist him in adjusting his mental state, rather than to study completely in accordance with the standards every day, I think, I assist him in finding a more comfortable learning mode, adjust his mental state, which is probably more important for him.*(P2).

729     4.5.2 *Experiential knowledge & Reassurance.* Supervisors often also provided experiential knowledge, mainly from  
730     their own personal experience. The development of habits was frequently mentioned in interviews and user reviews.  
731     For example, Internal habits mainly refer to the scientific methods that clients should have in order to achieve their  
732     work goals, such as “*mastering scientific memory methods and regularly reviewing what they have learnt*”(UR62); “*guid-733  
734  
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738*ing self-disciplined people to take stock regularly and insisting on daily summaries and reflections”(UR137), etc. External  
habits refer to having a good body for work and making a better work environment at home, such as “*reminding clients  
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780* to combine work and rest”(UR82), “*adhering to healthy lifestyle habits*”(UR43; UR155), and “*making a safe and orderly  
work environment*” (p12).

Interviewees and user reviews mentioned reassurance as a big benefit of experiential knowledge. P1 said she can boost the client’s confidence and promote motivation to complete tasks by conveying experiential knowledge during supervision. “*The client is aware that I went through the same process to improve my English from being extremely poor to being so good now. I assure him that the method is effective as long as the daily plan is carefully followed.*”(P1), P15 felt reassured, “*I always believed for a while that I wouldn’t be able to move on from my breakup, but my supervisor assured me that everything would be alright if I kept busy, as that is how he did. He also said that denial- anger- regret- depression- acceptance was a necessary process.*”(P15)

4.5.3 *Formal information by Q & A.* Part of the supervision service includes the provision of some professional formal knowledge, in the form of questions from clients and answers from the supervisors. For example, P4 said, “*A client with poor geography needed to take the National College Entrance Examination in 15 days. So I supervised his revision and carefully answered his geography questions. His geography score improved by 20 points.*”(P4) UR9 explained how supervisors use their own resources and connections to provide employment-related answers to clients. “*In addition to supervising my self-development outside of work hours and ensuring my learning time, my supervisor assisted me with my career transition. When I mentioned that I wanted to switch to a large internet company, my supervisor answered many of my questions and referred me to a Tencent product expert to answer the rest.*” P20 said that even though the service wasn’t part of the supervision service but also wasn’t like a tutor, this formal knowledge was given to help the supervision service do its job better. “*It is possible to solve in a timely manner minor problems related to professional knowledge that arise while the task is in progress. Some clients do not stick to their tasks or schedules simply because some formal knowledge is unclear, and our service is thought to clear the obstacles and assist them in completing their tasks.*”

## 4.6 Emotional Support

4.6.1 *Accompany and take “responsibility”.* Creating a sense of companionship and relieving client stress by taking “responsibility” are important ways in which supervisors can provide emotional support. As P1 said, “*Many clients seek out a supervisor for companionship and to reduce loneliness*”(P1) and P2 said, “*Communication and friendship are very important to the supervisor. If the supervisor is like a mechanical robot, informing you that it is time for you to learn, this is meaningless. The supervisor values emotional communication and companionship.*” P16 felt the sense of companionship helped her, e.g. “*My supervisor eats lunch with me via voice chat, giving me the feeling that I am not eating alone, So I then consciously control my intake of high calorie foods*”. Taking “responsibility” is frequently mentioned by interviewees and user reviews. When a client complained about the slow completion of tasks, the supervisor responded, “*That’s my problem too; I didn’t even notice you were slacking.*”(UR476). When P15 was unable to control her emotions, the supervisor told her “*It’s our job and responsibility to help you get over your breakup, you don’t need to blame yourself too much (for not being able to do it), it’s normal to feel sad and stuck, and I’ll be here for you*” P4 explained that, “*for*

*clients who are preparing for exams and who want to make changes, they are under sufficient pressure, and many of them are perfectionists. Therefore, we must take the initiative to assume responsibility and convince them that we will always be there to help them achieve their goals, and that it is not entirely their fault if the goals are not met. This will make them significantly less stressed and more focused on their own task completion.”(P4).*

*4.6.2 An atmosphere of trust and security.* For some clients, the emotional support of the supervisor is reflected in creating the suitable atmosphere. P2 said creating an atmosphere of trust and security can help she carried out her work, “*When a trusting relationship is established between the client and me, the client will be more sincere in telling me how he is going with his tasks. So I will go out of my way to create an atmosphere where whatever is said and done, he is safe and I will not judge his behaviour as good or bad.*” P11 said that there were times when she did not complete tasks and when she was beating herself up and did not want to reply to the supervisor’s messages, the supervisor would tell her that it was okay. “*It’s a completely different feeling to when I was a kid and my parents always blamed me for not completing tasks [...] I would then seriously talk to the supervisor about why I hadn’t completed the task and analyse the reasons why*” (P11, client). P12 indicated that CSS have a companionable learning atmosphere without peer pressure. “*I’ve been in an online study room before, and the study gurus I met there tended to give me EMOTIONAL damage because I’m one of those weak-minded people who also procrastinate badly. It’s stressful to see others working so hard. The atmosphere is simply comfortable and companionable with the 1v1 manual supervision mechanism.*” (P12, client).

*4.6.3 Enough feedback.* A significant percentage of clients purchase SDS services because the supervisor can give them adequate responses and feedback. ‘Praise’, ‘encouragement’, and ‘comfort’ are words that were often mentioned by user reviews and interviewees. P9 said creating an atmosphere of trust and security can help she carried out her work, “*When a trusting relationship is established between the client and me, the client will be more sincere in telling me how he is going with his tasks. So I will go out of my way to create an atmosphere where whatever is said and done, he is safe and I will not judge his behaviour as good or bad.*”. We also learned from P2 about supervisors’ techniques for providing feedback. “*I first offer comfort and put myself in the client’s position to see why the client have difficulty with self-discipline. I believe that empathy, not a supervising approach, is required in this situation. I will make the clients feel that I am able to understand them by putting myself in their shoes.*

#### **4.7 Perceptions of Clients**

*4.7.1 “human being”.* The interviewees stated that compared to task tracking apps, supervisors are “human beings” and as a result, clients tend to form a positive impression of them, which in turn enhances the external motivation. as P12, said “*Because she’s a social individual, I want to leave a good impression, even though she is a stranger, and I don’t want her to think I’m lazy*”(P12). P10 had likewise done better at her task because of the enhanced external motivation. P10 “*It’s more intense with a supervisor, I feel like the CSS service gives me have an extra kind of motivation to push forward and just not let myself slack off. So I can make better use of my time and complete my tasks*”. Besides, interviewees and user reviews indicated that they preferred to think of supervisors are as some of the close people around them. For example, “*the supervisor is like my sister*”(P6, UR268, UR671,...), “*The supervisor is like my teacher, I think she is smart and admire her. She is also willing to teach me, which makes me think of her as a teacher.*”(P10), “*my supervisor is like a mother. She reminds me of everything and takes care of my mood, just like my mother did.*”(UR172) and “*my supervisor is like my partner.*”(UR203). P11 said that her supervisor can also be a teacher and a close friend,e.g, “*she is always very efficient and attentive when supervising my studies, as well as giving constructive advice. And she accompanied me like a*

833 close friend when helping me to change my daily habits making me feel warm". P7 explained how she realised that the  
 834 supervisor was not just a person who served her, and that she could become more comfortable in CSS by getting along  
 835 well with the supervisor, e.g., "I remember one supervisor. When I was busy, I didn't answer her WeChat messages. I began  
 836 to feel that she was no longer very nice to me; she merely reminded me to be on time and her encouragement was robotic  
 837 and emotionless. [...] Then I realized that it's a two-way street: if you take your tasks seriously and treat your supervisor  
 838 with respect, she will be willing to supervise you and help you become a better person and vice versa."

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 841 4.7.2 Personalization. Personalization is valued by user reviews and interviewees. Some interviewees indicated Personalization was reflected in diversity and flexibility. For example, P13 said "*Reminder times are personalized in a way that other task reminder and tracking software cannot*". P9 said feedback of supervisor is diverse. "*When I complete the task. I use the app to record it, it gives me the same feedback every time. But the feedback of my supervisor is very varied and it's also something I would like to hear, so I am more motivated to do the next task!*". Personalisation is also reflected in the fact that adaptability is almost always mentioned by interviewees- as supervision services were used for longer periods of time and clients spent more time with supervisors, interviewees suggested that services more in tune with their needs could be provided. P14 said that he and his supervisor can develop a tacit understanding. "*(After two months of supervision), my supervisor already knew when I would slack off; for example, after a meeting at home, I would frequently start watching Bilibili, and my supervisor would come to me at that time. Also, the supervisor is aware that I must not be in good working condition on Mondays, so he frequently comes to chat with me on Mondays to ensure that I am working.*" and "*(Over time) the supervisor got to know me better and knew what was on my mind, so he knew the best way to communicate with me.*" (P16). There were also many interviewees as well as user reviews indicating that as opposed to some apps that promote behaviour change, "*the supervisor is a good match for my personality, so I can have a good conversation with the supervisor*" (P11) and "*my supervisor can give more personalised advice on how to complete tasks each day*" (P5)

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 862 4.7.3 Balance of stress management and motivation management. The interviewees also provided an important perspective, namely balance of stress management and motivation management. For example, P4 said "*Watching live online learning streams such as Study With Me, it is easy to develop a sense of admiration for the streamer, such as envy of the streamer's education, which causes you to become more anxious and increase your stress. However, when a supervisor is present, pressure and motivation are present, but in a healthy balance.*" and P10 said "*(with a supervisor) I will be able to chat and it will largely ease the anxiety of preparing for the exam: the supervisor will comfort me when I am anxious and encourage me when he lacks motivation.*" P7 said that the supervisor is more flexible, unlike the apps kind that tends to just push her and put pressure on her, e.g., "*with exercise or habit-forming APP kind, if you don't reach the goal one day the App will actually kind of blame you, the supervisor is a good balance of my pressure, sometimes there are really some reasons I don't want to exercise today, the supervisor also won't make me feel guilty*"

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 875 4.7.4 Negative Experiences During CSS. Privacy and Harassment were mentioned by interviewees and user reviews.  
 876 For example, P15 indicated she was very private, so it was trouble to report to the supervisor every time, "*for example, when I write my dissertation it always takes some time to obscure my personal information before I Daka.*" and UR163  
 877 said '*My supervisor got my personal information. He harassed me at the end of my supervision, and I regret hiring this supervisor*'. Irresponsible and inexperienced supervisors are inevitably encountered by customers. P6 said, '*I had an inexperienced supervisor who did a poor job of assessing how I was performing throughout the day, what was wrong, and what I needed to improve, and if I slacked off, he didn't try to rush me to complete my tasks but rather acted as a time*

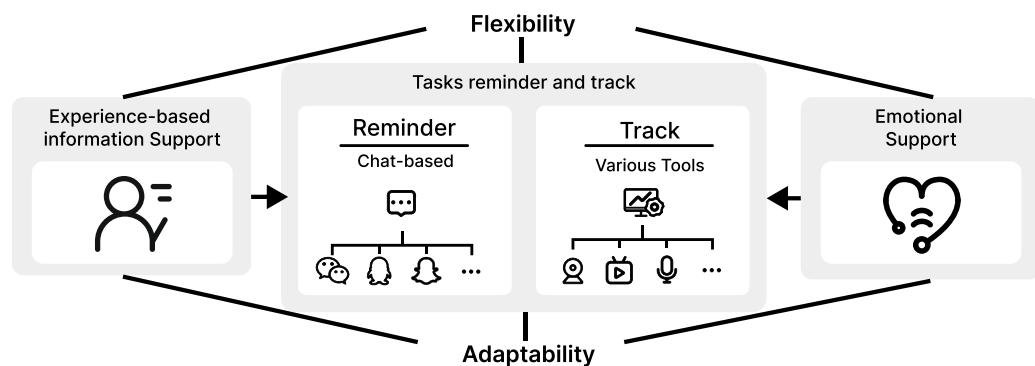
885 reminder tool, which didn't help at all." and UR257 said "She has a perfunctory attitude at the end of the service, just a  
 886 reminder each morning and noon. She was clearly enthusiastic at first, but by the end of the service, she was a completely  
 887 different person." (UR257) . Some customers find CSS sometimes interrupts and disturbs them, like "Because it's based  
 888 on WeChat, a reply to a supervisor's message can fall into the WeChat black hole of time: check your friends' messages,  
 889 and time passes quickly." (UR584) and "Once I was in a state of mind flow studying English and didn't look at my phone,  
 890 the supervisor suddenly called me and said that according to my previous schedule, I should run now and interrupted me."  
 891 (UR633)

## 894 5 DISCUSSION

895 In the interviews of the 21 interviewees and analysis of user reviews, we aimed to understand how and why CSS work  
 896 in promoting behaviour change. We identified three key practices in CSS: reminding and tracking, experience-based  
 897 information support and emotional support. We also understand the perception of clients. By connecting our findings  
 898 with prior literature, we discuss our key findings as well as their theoretical and practical implications. We began by  
 899 discussing the CSS phenomenon itself, focusing on key practices and factors in CSS as well as the role of supervisors,  
 900 and then moved on to discuss the implications of CSS for on-demand work.

### 901 5.1 Chat-Based Supervision: Why and How

902 5.1.1 Key Practices and Factors in CSS. CSS key practices and factors can provide design implications for current  
 903 research on persuasion technology. Our empirical research has shown that social support can assist in promoting  
 904 behavioural change when people are alone in dealing with behavior changes in daily habits and task completion.  
 905 According to our findings on the practice of CSS, we summarized the key practices and elements that make CSS work as  
 906 shown in Figure 4. Task reminders and tracking as the core, and it is essential to provide clients with both informational  
 907 and emotional support to assist them in overcoming psychological and informational barriers to completing their  
 908 tasks. The experience-based information support provides personalized support based on the client's needs and the  
 909 supervisors' experience, and the emotional support also caters to the client's tasks and moods.



910 Fig. 4. Key practices and factors in CSS

911 Specifically, as we found in the findings, our participants' daily behavior change experiences indicated that although  
 912 they had clear goals for behavior change and task completion, the process is not clear and contains many barriers, most  
 913 notably information barriers and psychological barriers. The supervisor's social support, including experience-based  
 914 Manuscript submitted to ACM

information support, and emotional support, essentially helps them in clearing barriers. Experience-based information support focuses on facilitating task completion through information, e.g. clients who can prepare for exams can learn more to improve their self-efficacy, while emotional support focuses on stress relief and negative emotion relief, with immediate regulation of emotions facilitating their task completion. Furthermore, it is important to understand that the process of behavior change is characterized by ups, downs, and movement toward and away from the original goal. So flexibility and adaptability are important. Flexibility implies that the supervisor will use a more appropriate strategy for the client based on the client's and tasks characteristics. For example, as mentioned in our findings: dynamic adjustment of reminder timing; diversification of reminder tools; different information support according to the needs of the customer at different stages and situations; sufficient and flexible feedback to ensure emotional support. Adaptability implies that as the service lengthens, the supervisor will get to know the client better and provide a more satisfactory service to the client. For example, the supervisor can be more aware of when it is appropriate to remind the client to get to know them.

**5.1.2 Social Role of Supervisors.** The social role of supervisors is a factor that cannot be ignored when it comes to CSS. Supervisors can take on different roles (e.g., teacher, sister, partner) when performing tasks with different purposes, thus allowing them to address the dynamics of the service process (i.e., different clients, different needs). And social role of supervisors also helped us to understand the on-demand work of CSS. Based on our findings, we found that supervisors present a diversity of roles in their interactions with clients, including **servant**, **expert**, **mentor** and **partner**, as shown in the Figure 5. We refer to the two dimensions of closeness and autonomy proposed by Ringfort-Felner et al. [84] which is proposed to analyse the role of the robot. The supervisor, on the other hand, is a real person as opposed to a robot, we finally settled on replacing the 'autonomy' dimension of the robotics domain with 'dominance' dimension.

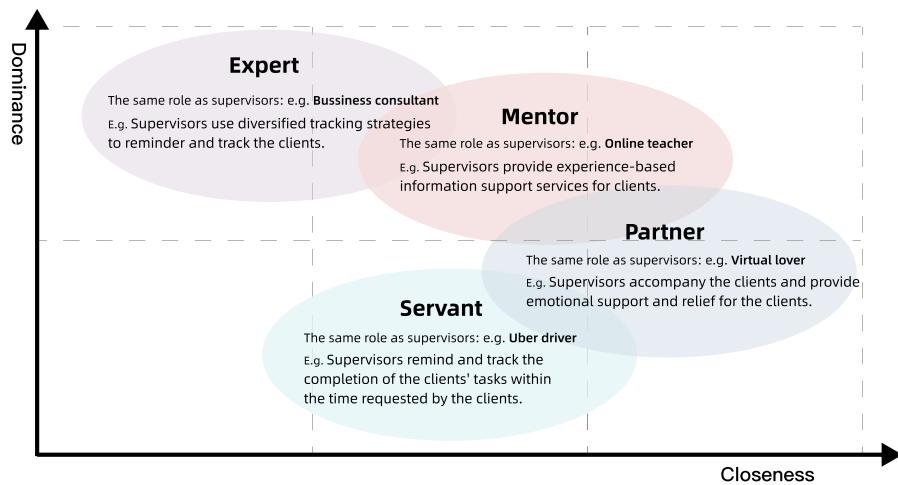


Fig. 5. The diversity of roles played by supervisors (the vertical axis shows the difference in dominance between roles and the horizontal axis shows the difference in intimacy between roles)

**Servant.** Servant means that the goal of the worker's task is to satisfy the customer's needs through service. For example, uber drivers in on-demand work [81] or beauty workers [9], who perform tasks according to orders as service

989 providers. According to our findings such as section 4.4 and section 4.6, the servant is an important role . In tasks  
 990 reminder, supervisors is essentially a task performer, supervisors is required to meet as many requests as possible  
 991 from the client. And supervisors can be complained about if he does not remind the client on time.  
 992

993 *Expert.* An expert is considered a formal, specialist role with specialist knowledge skills [10, 10] such as business  
 994 consultants [103]. According to our findings in section 4.3, professional supervision strategies and tools such as spot-  
 995 checking, video monitoring the client's learning status in real time, viewing the client's screen time statistics are used to  
 996 monitor and track the client's task completion. Especially when assisting clients without self-discipline, the supervisor  
 997 may have to resort to such strict methods to create a tense or oppressive atmosphere in order to achieve the desired  
 998 supervisory effect.  
 999

1000 *Mentor.* A mentor is an experienced individual who advises and assists clients with less experience over time. A  
 1001 mentor not only imparts knowledge and experience, but also serves as a motivator [10]. Other similar jobs that take  
 1002 on the role of mentor like online tutor. They can provide theoretical or practical guidance in a specific area, and it  
 1003 is worth noting that, unlike the 'expert' role, they frequently make tutoring more effective through closer communica-  
 1004 tion. Supervisors frequently serve as mentors in CSS practice, providing clients with knowledge, experience, and  
 1005 psychological support. Experienced supervisors frequently act as tutors to plan, teach, answer questions, provide guid-  
 1006 ance, and even help students develop good habits. Furthermore, the supervisor will pay attention to the psychological  
 1007 state of the client who is under pressure and work to boost the client's confidence and motivation to finish the task.  
 1008

1009 *Partner.* Partner is an informal, intimate social relationship that provides companionship and emotional support [23].  
 1010 Numerous clients described their relationship with their supervisor using phrases such as "like-minded friend" and  
 1011 "close partner" in our study. Through in-depth communication, supervisors in CSS build trust and friendship with  
 1012 their clients and help them overcome feelings of isolation. Additionally, the supervisor's long-term companionship  
 1013 and emotional support allow them to grow close to their clients and even become close friends.  
 1014

1015 As mentioned in section 4.6.1 regarding the social advantage of the supervisor, one of the most significant distinc-  
 1016 tions between the supervisor and a tool is that the client tries to make a good impression and cultivate positive social  
 1017 relationships. This social-psychological factor will boost external motivation, which the client lacks when confronted  
 1018 with the tools. Therefore, we can optimize the persuasive tool from an anthropomorphic perspective, such as using a  
 1019 chat-based task tracking interface that makes the user feel like they are talking to a real person. Clients may be drawn  
 1020 to the supervisor's appearance, moved by the supervisor's attitude, admired by the supervisor's deeds, all of which  
 1021 may result in behavioral or psychological changes. As a result, we can endow the tool with "human-like" characteris-  
 1022 tics such as an attractive appearance, a responsible work attitude, inspiring experiences, and stories. Combine with  
 1023 our analysis of the role of the supervisor: expert is persuasive through dominance, mentor combines closeness and  
 1024 dominance for persuasion, and the role of partner allows for better persuasion through closeness. We believe this is a  
 1025 good design implication for persuasive technology, particularly chatbots for persuasion. In contrast to chatbots which  
 1026 are typically designed to communicate with users in a single role, we prefer to simultaneously employ multiple roles  
 1027 for persuasion. For example, as an alternative to a single persuasive chatbot communicating with the user, a group  
 1028 chat with four chatbots with different roles can be designed to persuade the user based on their needs.  
 1029

## 1030 5.2 CSS and on-demand work

1031 *5.2.1 Challenges of being a multi-social roles.* On-demand work typically involves a single type of customer relation-  
 1032 ship, uber drivers simply pick up and drop off passengers based on orders [38], a virtual lover provides intimate and  
 1033 emotional services to customers [98], or a business consultant provides professional information guidance to customers  
 1034

1041 in a specific area of expertise [103]. While according to our analysis of the role of the supervisor, multi-social roles  
1042 have complicated the supervisor's relationship with the client. We discovered that when a supervisor plays the role  
1043 of expert and mentor, he or she has a certain degree of dominance and can guide, motivate, and even intervene in  
1044 the behavior of customers. However, the supervisor should also serve as the customer's servant and consider the cus-  
1045 tomer's level of satisfaction with the service. UR 411 said that the purpose of hiring a supervisor was to have someone  
1046 supervise him, but he did not wish to "make himself uncomfortable." Although he desired to complete the task, he felt  
1047 uncomfortable under the strict supervision. As a result, supervisors need strike a balance between better supervision  
1048 implementation, facilitating task completion, and the client's attitude toward the service when they work. This unin-  
1049 tentionally increases the supervisor's workload. Besides, multi-social roles may make the work of supervisors more  
1050 difficult to measure. Clients have the right to evaluate the quality of service, including the right to provide feedback  
1051 to the platform on the quality of the supervisor's service at any stage of the service and to request replacement of the  
1052 supervisor, refund, or compensation if the service is unsatisfactory. The platform implements these mechanisms to  
1053 protect the interests of customers, however, since the work of CSS is subjectively evaluated, there is a possibility that  
1054 the supervisors interests may be compromised as a result.  
1055

1056 *5.2.2 Design Implications.* The platform for on-demand workers of multi-social roles needs to set more comprehensive  
1057 and humanized evaluation standards. For instance, it should not be based solely on the user evaluations of a single  
1058 client, but should instead refer to the user evaluations of multiple clients on the worker; in addition to referring to  
1059 customer evaluations after the completion of the service, the platform should also actively participate in the evaluation  
1060 of the worker during the service process; and in addition to collecting subjective evaluations from customers, the  
1061 platform should also strengthen objective evaluations (such as recording the duration of the work and the results of  
1062 the work, etc.). Rather than establishing a "one-size-fits-all" evaluation standard for the sake of benefit indicators, the  
1063 evaluation standards should take into account the difficulty of a worker assuming multiple roles. Typically, the platform  
1064 requires supervisors to maintain a very high renewal rate; however, as the client's "partner", the supervisor does not  
1065 want a self-disciplined client to renew the order. And as a service provider, the supervisor must strictly supervise the  
1066 customer to complete the target task according to the customer's specifications. However, as a "partner" and "expert"  
1067 with multiple roles, the supervisor must also consider whether the customer has the ability to complete the task and  
1068 whether the customer's current mental health condition is conducive to completing the planned target task. Therefore  
1069 The platform needs to set a humanized evaluation standard based on the actual situation encountered by the worker.  
1070

## 1071 6 CONCLUSION

1072 Through our analysis of user reviews and interviews with clients and supervisors, we have identified four key scenarios  
1073 and motivations for the use of CSS, as well as three key practices that support task completion and behavior change.  
1074 To revisit our research questions: RQ1: What motivates people to hire or to become supervisors? Our study found  
1075 that clients are motivated to use CSS when they are facing a challenging task and need support and accountability to  
1076 complete it. Supervisors are motivated by the flexibility and additional benefits of the work. RQ2: What are the practices  
1077 and interactions between clients and supervisors? Our study identified three key practices in CSS: task reminders and  
1078 tracking, experience-based information support, and emotional support. These practices facilitate the completion of  
1079 tasks and support behavior change through accountability, information sharing, and emotional support. RQ3: What  
1080 are the factors contributing to support in task completion and behavior change? Our study has identified key practices  
1081 in chat-based supervision services (CSS) that support task completion and behavior change. These practices include  
1082

1093 providing regular task reminders and tracking progress, sharing experience-based information and advice, and offering  
 1094 emotional support and encouragement. We have also found that the social relationship between supervisors and clients  
 1095 plays a role in facilitating behavior change and task completion. Our findings have implications for the design of  
 1096 persuasive technology and on-demand work.  
 1097

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