All in One Group: Current Practices, Lessons and Challenges of Chinese Home-School Communication in IM Group Chat

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ABSTRACT

When schools and families form a good partnership, children benefit. With the recent flourishing of communication apps, families and schools in China have shifted their primary communication channels to chat groups hosted on popular instant-messenger(IM) tools such as WeChat and QQ. With an interview study consisting of 18 parents and 9 teachers, followed by a survey study with 210 teachers, we found that IM group chat has become the most popular way that the majority of parents and teachers communicate, from among the many different channels available. While there are definite advantages to this kind of group chat, we also found a number of problematic issues, including a lack of privacy and repeated negative feedback shared by both parents and teachers. We discuss our results on how IM-based group chat could affect Chinese teachers' authoritative figures, affect Chinese teacher's work-life balance and potentially compromise Chinese students' privacy.

CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in collaborative and social computing**.

KEYWORDS

parental engagement, home-school communication, computer-mediated communication, group chat, WeChat

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1 INTRODUCTION

When schools form partnerships with families and the community, children benefit greatly [11]. Family and schools provide the two most important environments closely associated with a child's development. Children are likely to receive a number of benefits from these positive environments, including higher grades, the likelihood of earning course credits, physical and psychological well-being, and a more well-rounded development, when family and school cooperate [24, 31]. In terms of the communication between home and school, teachers share the responsibility of communicating with parents how children behave in school in a clear and prompt manner. Teachers also need to encourage parents to be involved in school activities as well as the education of their children. Parents, on the other hand, need to coordinate and communicate with teachers so that children grow up in a better environment assisted by forces coming from both directions. High-quality communication between home and school often involves efficient transmission of information, as well as a positive, trusting relationship between teachers and parents [26].

A common complaint regarding the current state of home-school communication is that it does not happen often enough.[9, 31].For those H-S communications that do take place, the quality of such communication is often less than ideal. Instead of substantially increasing the frequency of H-S communication, another possibility is to increase its effectiveness. Information asymmetry between teachers and parents is a well-recognized issue[31]; home-school communication is often described as one-way, given that most schools and teachers take the initiative to decide when, where, how, and what types of content are communicated with parents. The existing research was either initiated by schools or focused on how schools and teachers could improve their ways of communicating with parents, such as by contacting parents regularly and

by inviting them to various school events [12]. A number of H-S communication tools, such as SMS text messages, brochures, and weekly report cards have been proposed and explored by schools [4, 22, 31]. Parents, on the other side, were often seen as more passive information receivers, since they have few channels available to them by which they can express themselves.

With the mediated communication landscape, which has expanded significantly over the past decade, teachers and parents have access to many distinct forms of communication (phone calls, emails, and text) as well as hundreds of communication applications. Although the effectiveness of parental involvement is evident for American children from a variety of cultural backgrounds, one cannot ignore the way ideologies about learning and the general outside world educational environment could have an impact on H-S communication. For example, learning is viewed as a moral endeavor in China and thus teachers are often considered to be highly authoritative and even respected as a father figure (same as 'teacher authority', which comes from the well-known Chinese saying "One day as your teacher, like a father for a lifetime," which implies that teachers are given the highest respect in China.)[8]. This difference could also come from a social communication perspective, as common communication channels in the Western world, such as emails, may not be as popular in China. Thus, it is unclear whether H-S communication operates similarly in counties where such ideologies differ from those of the United States.

How do Chinese parents and schools adopt these newly-emerging channels? How do various channels have different impacts on H-S communication? In this paper, we take an HCI perspective to better understand how home-school communication unfolds in China. We interviewed 18 parents and 9 teachers across a range of grade levels and subjects, followed by a survey study with 210 teachers to collect 210 instances of home-school group chats. This paper is organized as follows: first, we present a general picture of H-S communication in China, with a focus on how technology-mediated tools facilitate H-S interaction. We then discuss the home-school group chat, a prevalent, unique, and yet little-documented practice of communication. Our findings suggest a number of benefits of using H-S group chat, including increased frequency of communication, more easily-reachable parents and teachers, and more small talks for relationship building and empathy development. However, we found a number of negative issues, including a lack of privacy for students, repeated negative feedback, and a sense of insecurity shared by both parents and teachers in regard to these group chats. We discuss design implications to help guide HCI researchers and industry to design better tools (or features thereof) that may alleviate challenges faced in the context of H-S communication. Our main contributions are in providing empirical insight into the big picture of how home-school communication unfolds in China, through: 1) the various channels parents and teachers adopt in information exchange, and 2) H-S group chats as a novel, effective, yet little-documented communication channel.

2 RELATED WORK

In this section, we draw upon literature on three topics to better understand the state of the art for H-S communication in China. We first discuss educational research relevant to parental involvement

and H-S communication, with a focus on how the unique Chinese cultural context could affect its applicability. Second, we examine the lessons learned and challenges faced by current H-S communication tools. Third, since our results indicate that Chinese H-S communication relies heavily on IM-based group chat, we examine how group chats were leveraged in other working contexts.

2.1 Parental Involvement and Home-School Communication

Prior research shows that parental involvement in children's learning (e.g., discussing children's schoolwork with them and attending parent-teacher conferences) facilitates children's learning and, ultimately, their achievement, no matter whether in China or the US[11, 24, 31]. Moreover, evidence exists that the quantity and quality of China's parental involvement is higher than that of the US[9].

There are various types of parental involvement, which can be categorized as home-based parental involvement(HBI) and school-based parental involvement(SBI)[20]. HBI is parents participation in children's education within home settings[38], such as parent-child discussion, parents helping with homework, reading to children, and enrichment extracurricular activities[20]. SBI is parent participation in the child's education within school settings or through interaction with school personnel[38].

HBI is more popular in China. For instance, parents may engage in HBI with children in elementary schools by helping with homework and reading to them [29]. For children in their adolescence, such involvement might become more indirect (e.g., the parent and the child may talk about school life). Although these examples of HBI are not directly related to school, prior research shows that both the quantity and the quality of HBI positively related to a child's academic achievement [18].

SBI, especially home-school communication, is less observed in prior research on Chinese education [10]. Ng [39] leveraged data consisting of 310 kindergartens, elementary schools and secondary schools in Hong Kong and found that Chinese parents typically did not like to get involved in school, and teachers did not like it when parents got involved in school, either. Similar results were found in studies on mainland China as well (e.g., Shenzhen [32] and Zhejiang Province [13]). Existing research shows that SBI is strongly correlated to the teachers' attitudes toward parental involvement [37, 51]), but Chinese teachers "prefer parents to be involved at home" according to a previous study [40]. The same line of research indicated that teachers are typically viewed as knowledgeable authorities according to traditional Chinese culture. Moreover, it also noted that the education and learning that takes place in school is different from the type of learning that takes place at home. The real task of parents and parenting arises in educating children within their own families, in order to assist these children with their learning at school; this typically does not include parents working 'with' teachers on school matters, however [7] . Notably, direct parent involvement with teachers is conceptualized as a remedial force, implying that something must have gone astray, if parents are required to work alongside teachers to assist with their child's education [21].

A great number of practical interventions such as holding yearly conferences and delivering monthly reviews have been recommended by prior researchers [12, 33, 36]. Many of these have been implemented by policy-makers. For example, Australia[1], US[2] as well as China [3] all have taken actions to promote and guide home-school partnership building. Due to the aforementioned unique cultural background of China, and the ever-changing policies and technologies , we need to develop a deeper understanding of how H-S communication evolves with all these novel communication tools available.

2.2   Media in Home-School Communication

Teachers and parents leverage a variety of tools for communication, ranging from traditional channels including phone calls and SMS to modern, internet-based channels such as email and mobile phone applications [53]. In 2011, the National School Public Relations Association (NSPRA) survey showed that teachers and parents in the U.S. mostly used phone calls, email, websites, e-Newsletters, and parent portals [1, 19]. As information and communication technology(ICT) becomes more accessible and affordable, communication via mobile devices has become more prevalent than ever [42]. H-S communication is no exception - most recently, a genre of mobile apps that facilitates the flow of near-real-time information between home and school, such as Bloomz, ClassDojo, Remind, has recently gained traction. These apps provide features and communication channels tailored to H-S communication, such as class updates, class calendar, and two-way messaging[2, 6, 41].

To some extent, these applications help alleviate some obstacles that existed in modern H-S communication, some of which might even be resolved with the introduction of these new channels. For example, communication via real-time chatting apps significantly lowers the efforts and commitment required to initiate communication, providing both parents and teachers with easier access. The synchronous, quicker turn-taking nature of communication also brings a number of benefits. However, one can also anticipate a number of challenges that may arise from this brand new context. For instance, teachers' privacy and work-life boundaries could be threatened or undermined[25].

However, this type of applications dedicated to the course of H-S communication have not gained popularity in China. While tools like Jiaxiaotong(one Chinese mobile app, the name means bridge between home and school) has been developed, generic instant messaging tools such WeChat and QQ are much more widely used than these specialized applications based on the authors' observation. Given that the usage of IM in the context of H-S communication is rarely documented in literature, we seek to fill in the gap in this paper. In the next section, we take a look at how group chat is used in other workplaces and examine what are potential benefits and challenges brought by IM-based group chats.

2.3   Group Chat in HCI context

Recent development of technology has radically changed the system of telecommunication, as three different paradigms of communication were introduced: one-to-one, one-to-many, and group communication[48]. Among the three, group chat typically involves a relatively small number of familiar participants, and thus is considered as impersonal and private[44]. Group chat applications have gained popularity these years. By enabling quick, team-wide message exchange on different channels, these applications have the potential to minimize the friction of group communication, particularly for distributed and remote teams[58]. Many people use systems such as WhatsApp, Slack, Facebook Group chat, Microsoft Teams, and Google Hangouts Chat to make decisions, answer questions, troubleshoot problems, coordinate activity, and socialize. As of 2019, Slack alone reported over 10 million daily users[4].

Prior HCI work on group chats has explored the potential benefits group chat might have on a user's work and life. Advantages such as better efficiency compared with one-on-one chats [43], a more liiberal decision-making process [3], high alertness as well as a sense of relaxation [5] all have been discussed. That being said, chat systems also have a number of downsides. Unlike email or forums, group chats are predominantly synchronous and thus lead to the expectation for quick response and a high volume of back-and-forth messages exchanged in rapid succession[5]. As a result, group chat systems generate long streams of unstructured back-and-forth discussions that may be difficult to comprehend[58]. The problem of notification overload in group chat has also been widely discussed [49], and this problem is even more serious as the group size increases [52]. In addition, context collapse problem also seems potentially more serious in multi-group chat channels [50]. Another significant downside of group chat lies in that it has weakened work/life boundaries and compromised users' privacy. Existing research showed that, while group chat was indeed an efficient communication channel in the workplace, there was a serious need to incorporate designs that set up personal boundaries within this communication tool[25].

Facing all the challenges of group chat in workplace, HCI reseachers make a lot of effort to ameliorate these problem in group chat. Interventions such as AI-based chatbot for emotion regulation [45], calendar-based visualization [16] and tools to structure and support persistent group chat conversations have been developed [15, 58]. For the Chinese H-S communication context, the reason why teachers and parents in China choose IM-based group chat as their primary communication channel remains unknown, as are the benefits and drawbacks such tools may have while enabling better home-school communication. In this paper, we contribute to this line of research by examining how teachers and parents experience and tackle challenges in group chat.

3   METHOD

3.1   Research Context

The main body of the modern Chinese school system can be divided into two parts: compulsory and post-compulsory.

After completing compulsory education, students have to take an entrance examination to compete for limited educational opportunities at higher levels. Moreover, post-compulsory schools tend to be more stratified, with teaching quality frequently associated with threshold admission scores [34]. For example, in 2009, a total of 2,305 colleges were registered in China; among those, only 112 were in the allegedly higher-quality "211 program," which received more financial support from the government[34]. These elite institutions of higher education only accept students with higher test scores and yield higher earnings for students later in life [34].

In this free, compulsory education system, students attend school for nine years, which can be broken down into two segments: elementary school (grades 1–6) and middle school (grades 7–9). Our research uses data from 21 schools located in the area of Ningbo, Zhejiang Province, balanced between education phase (elementary and middle school), region (urban and suburb), and school type (public and private; day and boarding). In 2018, the city had a population of over 6 million, with a GDP per capita of over USD 19,000 and an urban disposable income per capita of over USD 8,700. The per capita income of this city is higher than both the national and the provincial average. As a relatively rich area in China, there are over 400 elementary schools and over 300 middle schools, and the enrollment rate in compulsory education is 100%. At primary or middle school level, the average class size in China is 40-60 students. The average student/teacher ratio in the elementary schools is 17.6:1, and in the middle schools, 12:1. All compulsory-education schools teach the same subjects and use the same series of textbooks in school learning, while after-school learning time is around 27 hours per week (reported by PISA 2015[5]). The elementary student can directly get admitted to the paired public middle school, but need enter a lottery and take an examination if they want to try to get into a private middle school.

Ten teachers from different subjects (Chinese, Mathematics, English, and Science) participated in our research, their teaching careers ranging from 1 to 20 years. Meanwhile, five teacher participants currently serve as a head teacher, three have been a head teacher before but are not actively in the role; rather, they teach a core subject just as regular teachers do. Unlike regular teachers, however, head teachers bear greater responsibility for student performance and, accordingly, have more tools to influence it. Head teachers are responsible for organizing class activities, including the "spring outing" and evening parties, arranging and rearranging classroom seating, handling the class budget, appointing class cadres, and meeting with parents. Consequently, head teachers have a stronger influence on students than the other teachers. Moreover, they teach one of the core subjects to the class, so they have more information about student behavior and performance in their own subject, and/or are more concerned with student achievement in their own subject. Overall, if teachers are willing to influence students and are capable of doing so, we should see a stronger influence in subjects taught by head teachers[14].

Intense competition at higher levels encourages parents to invest in children's education in their earlier school years [47]. Economic analyses confirm that early investment in children is the most efficient form of investment for their later development [23]. In our

sample, 18 parents (12 mothers, 4 fathers and 2 couples) participated our research, 13 of them have sons, and the rest have daughters. All the parents exhibited a medium or a higher level of involvement in their children's education, and they all enroll their children in extracurricular classes.

Since the birth planning (jihua shengyu) program of the People's Republic of China featured a one-child-per-couple policy (the one child policy) from 1978-2015, Chinese children are usually considered 'the only hope' (means the only child attracts the whole family's attention and is highly expected to succeed) of their parents and therefore face high expectations in their academic achievement[27]. Accordingly, these parents tend to be more involved in their children's learning[55]. In our sample, almost 80% of the families had only a single child.

3.2 Procedure

We conducted a mixed-methods study using a semi-structured interview (N = 27, 18 parents and 9 teachers) and a survey (N = 210) to better understand current home-school communication in China and the challenges involved in these activities. We used an iterative approach as we adjusted our survey design, using insights learned from our interview data. Our study was approved by the relevant local ethics review committee.

3.3 Interview

First, we recruited 18 parents whose children were attending 17 different public elementary schools in the city of Ningbo, for a 30- to 60-minute semi-structured interview. We recruited these parent participants by approaching them in an after-class school, and through a snowballing technique during summer time. The demographic information about these participants is shown in Table 1. (For those parents who had more than one child, we only considered the child who was attending primary school during the interview period.) We approached parents who came to pick up their kids and asked them if they'd be interested in arranging an interview afterwards. We used this face-to-face recruitment technique to alleviate possible bias brought by recruiting via digital means, so that we did not end up with sample skewed more towards tecH-Savvy parents or those who are more familiar with CMC communication We admit that our sample might be biased, as our participants may be a subgroup of parents who are more committed to their kids. However, we adopted another survey study to test the generalizability of our results, which will be discussed later in this section.

In total, we talked to twelve mothers, four fathers and two couples when both parents were present. Thirteen parents (pairs) had only one child and four had two children. We conducted semi-structured interviews using a variation of critical incident technique [42]. Each interview lasted between 30 and 60 minutes. Parent participants were not directly compensated, but we bought them snacks and gifts as a sign of appreciation.

During the interview, we started with general questions about their children, and then moved on to ask how the school communicated with them and vice versa. Specifically, we asked participants to describe concrete, recent, memorable stories of incidents in which they heard from and/or communicated with their children's schools.

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[5]http://www.oecd.org/education/pisa-2015-results-volume-i-9789264266490-en.htm

Table 1: Demographic Information about Parent Participants

No.	Father or/and Mother	Child Gender	If Only-child
P1	Mother	Girl	Y
P2	Mother	Boy	Y
P3	Father	Boy	N
P4	Mother and Father	Boy	N
P5	Mother	Boy	Y
P6	Mother	Girl	N
P7	Mother	Boy	N
P8	Mother and Father	Girl	Y
P9	Father	Girl	Y
P10	Mother	Boy	Y
P11	Mother	Boy	Y
P12	Father	Boy	Y
P13	Mother	Boy	Y
P14	Mother	Girl	Y
P15	Father	Boy	Y
P16	Mother	Boy	Y
P17	Mother	Boy	N
P18	Mother	Boy	Y

Table 2: Demographic Information about Teacher Participants

No.	Gender	Years of Teaching Experience	Teaching Subject	If Head Teacher
T1	F	15	Chinese	Y
T2	F	4	Math	Y
T3	F	20+	Math	N
T4	F	20+	Chinese	Y
T5	F	17	Chinese	Y
T6	F	1	Chinese	N
T7	F	2	English	N
T8	F	10	Science	Y
T9	M	5	Math	N

Figure 1: Screenshot of the H-S Group Chat: (a)Group information; (b)Chat log of daily image information about children from the head teacher; (c) Chat log of small talk from parents;(d) Chat log of test score publication form the head teacher
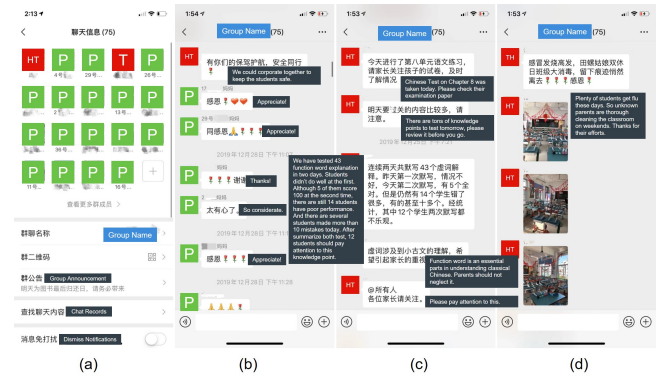
We asked participants about the channels they used, topics they discussed, and the reasons for their choices. We asked the participants to recall specific examples and reflect upon the benefits and downsides of each.

To further understand home-school communication in China, we hoped to recruit the specific teachers who taught the children of our parent participants, or at least those in the same school. Despite our best efforts, our parent participants expressed hesitance and concern about "bothering" their children's teachers for non-school-related purposes and were reluctant to provide these connections. Instead, we recruited 9 elementary school teachers from the same city to ensure consistency of the context by snowball sampling. The demographic information about teacher participants is shown in Table 2. Our teacher participants had teaching experience ranging from 1 year to 20+ years. Five teacher participants currently serve as a head teacher, three have been a head teacher before but are not actively in the role, while the remaining teacher had no experience of being a head teacher. We asked the teacher participants how they relayed information to parents, how they made decisions in choosing channels for communication, and what the expectations were for using each channel. Teacher participants were compensated 100 RMB (approx. $15) for their time.

All 27 interviews were audio-recorded and fully transcribed to assist further analysis. We adopted a bottom-up thematic analysis approach to identify key themes related to our main research question. We began this process by having three researchers independently code two parent transcripts and two teacher transcripts, using thematic analysis. Concepts were identified using open coding, and grouped into categories using axial coding. After several rounds of discussion and revision, we eventually came up with a coding scheme to apply to the remaining transcripts. As the analysis was ongoing, we iteratively found new themes (e.g., the flourishing of group chat, the interaction among other parents) and incorporated them into our code book. As we approached the end

of 27 transcripts, we found consistent, recurring themes and no longer encountered surprising new insights, which suggested data saturation. The interviews were reanalyzed to confirm that these categories captured all salient data points.

3.4 Survey and Observation

The resulting stories from our interview served as the starting point in which we learned that **all** 27 interview participants had used IM group chat as one of their **most common** ways of H-S communication. This was a surprising finding, as very little prior research has documented usage of group chat in the context of H-S communication. However, this was also expected in a sense, because WeChat and QQ are the most widely-adopted tools for daily communication in China[59]. For an everyday life context such as H-S communication, it is reasonable to expect that IM tools of this type are widely used. In addition, we were also aware that due to the limitation of our interview sample, there could be biases which would impede the intellectual contribution of our results. Therefore, we decided to adopt additional methodologies to explore this novel home-school communication channel, namely, the class-level IM group chat.

Based on the themes and codes from our interview data analysis, we developed a survey instrument to further validate our findings with 210 instances of WeChat groups. We recruited 210 teachers from across China and asked the them to describe one group chat that they've most frequently used.Among the 210 teachers sampled, 75% were female and 25% were male. Both novice and experienced teachers were covered. Approximately 25% of the teachers had taught for more than 20 years, 24% had between 10-19 years of teaching experience, and 51% had less than 10 years. In addition, 4% of the participants were high school teachers, 22% taught in junior high schools, 35% taught Grade 4-6, and 39% taught Grade 1-3. There was also one preschool teacher involved. The subjects taught varied, and included Chinese (34%), English (19%), Math or Science (36%), and History, Arts, etc. We invited the participants to provide basic, descriptive features of their group, such as the number of parents, the number of teachers, and the duration of these groups. We also asked them simple open-ended questions, such as why they chose to use H-S group chat.

To further validate our results, we did a observation (adopted in prior home-school communication work such as [56]) with a H-S group chat in Ningbo from August 2019 to January 2020. With the consent of all 5 participating teachers and all 70 parents, we observed the group's activities for a full academic semester. We used this observation data to enhance our contextual knowledge about H-S group chats, and to validate and enrich our research findings.

4 RESULTS

We detail the themes that emerge from our analysis. First, we describe which channels parents and teachers chose and adopted, and how they managed these channels for H-S communication in their everyday lives. We then dived in and focused specifically on how group chat might enhance some benefits or worsen existing barriers, or bring in new challenges.

4.1 Channels for H-S Communication in China

We found that parents and teachers exchanged information amongst themselves in a variety of ways. Table 3 summarized the channels the parents and teachers reported using for their H-S communication. Individual (one-on-one) communication channels between parents and teachers range from face-to-face meetings, to phone calls, to written communications delivered by the students. Through these channels, teachers could provide individualized, targeted information to parents. Broadcasting (or one-to-many) communication channels, on the other hand, included website, mass text messaging, and written forms. Through broadcasting channels, teachers send out the same message to every parent of their class without catering to individual parents. All participants reported that they participated in semi-annual parent-teacher conferences (similar to those documented in [57], where teachers typically provides generic updates about students' performance in class). Meanwhile, parents would have the chance to meet with teachers privately as well. All participates also reported to have participated in IM-based H-S chat groups, which are the only H-S communication channels that afford both broadcasting and two-way communication.

Participants described a number of factors, including urgency of the matter and media richness of the intended message (e.g., with or without image), that could impact parents and teachers when they choose a specific channel to communicate. A more prominent theme that emerged in our study lies in the blending and coexistence of multiple channels of communication. Namely, it is generally not an issue of utilizing one specific channel and forfeiting others; rather, all channels could co-inhabit well in the realm of H-S communication and would most likely supplement each other. One example is that multiple channels could be adopted for similar purposes. In fact, this has been intentionally adopted by some teachers as they try to ensure their messages being delivered promptly to the parents. For example, T3 described how she transmitted messages to parents of children in Grade 1:

> "When we released homework, we first informed the kids. Then we have the group chat with parents and we would send the same message again. Another channel we used is to send mass text message. We wanted to use multiple ways to communicate, as we wanted to ensure our message has been promptly delivered."

4.2 All in one group: a case study of H-S group chats

In our interview study, we noticed H-S group chats serve as an extremely prevalent way for Chinese parents and teachers to stay connected. As we have discussed, **all of our 27 interview participants**, regardless of whether or not they were a teacher or parents, reported that they were currently using at least one H-S group chat. Similar results were reported in our follow-up survey study, as 92.5% of teachers reported that they currently used group chat for H-S communication. Given the popularity of H-S group chat in China and the lack of prior research on it, we will describe in detail what H-S group chats in China are like, how they typically work, and how parents and teachers perceive the benefits and drawbacks of H-S group chat.

home-school group chats are typically organized into the unit of classes, where at least one parent of each student, together with all the main-subject teachers, were involved. In the 210 instances of H-S group chat that we collected, the average number of students in each class was 46.3, with an average of 58.5 parents and 3.8 teachers involved in each group. The vast majority of groups were held in WeChat, though an additional group was often held in QQ, both of which are popular IM services supported by Tencent. Additional platforms were reported include Dingding and WeChat Professional Version, but none of these were dedicated to H-S communication. According to our interviewees, even though lots of fathers were in the group, mothers were "responsible for home-school communication", while the fathers could take over when the mothers were unavailable. Figure 1 shows a screenshot of the H-S group chat that we observed for the past year which, interestingly, reflects the gender bias within H-S group chat. There were also some variations of such groups, such as parent-only groups or head teachers with a selective set of parents, which we will detail later. None of our participants reported that their groups included students.

H-S group chats are very stable and often last much longer than an average WeChat group, as 40% of WeChat groups last no longer

Table 3: Channels for H-S communication

H-S Communication Channel	Individual vs broadcast	Two ways vs one way	Definition
Parent visit school	I	T	Parents meet teachers at school, either scheduled or unscheduled, to discuss issues related with their children.
Home visits by teachers	I	T	Teachers visit students' home at a scheduled time. Teachers are often required to visit a number of their students per semester.
Phone Call	I	T	Parents and teachers talk to each other on the phone.
Instant Messenger	I	T	Parents and teachers chat through IM such as QQ and WeChat on a one-on-one basis.
Report Card	I	O	Parents receive a paper document containing kids' performance at school.
Website / Public WeChat Account	B	O	Parents browse information from school's website or WeChat public account.
Mass Text Messaging	B	O	Teachers send out mass text messaging containing uniform information to parents.
Written Forms	B	O	Teacher would pass along written forms to children, who should bring them to their parents. Parents are often required to return a receipt as evidence of receiving the information.
Parent-teacher conference	I/B	T/O	Parents came to school for a many-to-one meeting together with other parents whose children are in the same class. Teachers in different subjects often take turns to speak and provide relevant information about students. Parents also have the chance to schedule individual meetings with teachers at that time.
H-S Group Chat	B	T	Parents and teachers communicate in a IM group chat.

than one week [46]. Typically built on the first day of school, H-S group could last even after the students have graduated. T2 vividly described how the group chat in her current class was established:

> "By the time when they (parents for 1st grade) came in for check-in, I had had the group chat ready. I then wrote the identifier for the group chat on the blackboard, so that they'd see when they sent their kids to school and would then add the group chat on the site. [...] It has remained as the same chat even if I was no longer the head teacher of that class. I was no longer the admin but the class kept using the same group, because we had accumulated so many things in the past three years."

4.2.1   Rules. Another important feature of H-S group chats is their rules, since both parents and teachers pointed out that rules were prevalent in the groups and were usually followed strictly. Rules commonly fell into two different categories: membership (i.e., who could join the group) and content (i.e., what type of information could be shared). All but one of our participants reported that their H-S group chats were restricted to parents and teachers of the particular class only. The one exception allowed grandparents (who often came to school to pick up their kids) to be in the chat, so they could easily access information such as the school schedule. T2 explained her rationale of why she thought it necessary to keep H-S group chat this way:

> "There were parents who hired professionals to pick up their kids after school and they wanted to join for coordination reasons. I found this not particularly convenient, since we could chat about school and

other kids, which should be kept within parents and teachers. Thus I kindly asked them out. "

As for content-related rules, those would mainly consider what was allowed to be discussed and what was not. For example, non-school-related content such as advertisements were presumably banned in H-S group chats. Such rules could be either explicit or implicit, as quoted by P5, who felt parents in her H-S group chat had a sense of self-regulation; they would not post irrelevant contents to the group. Teachers, on the other hand, would also be clear from the start by declaring what types of information was allowed and what was not. Often, effective strategies would evolve from practice as parents and teachers further engaged with the group; these would sometimes become highly personalized across different H-S groups, depending on the usage habits of the corresponding parents and teachers. For example, T6 depicted a common phenomenon in H-S chat, in which parents reacted over-enthusiastically to teachers' messages, so much that important information was lost in the huge inflow of messages. In contrast, when parents did not respond, teachers wondered if the message had been received; T1 described how she managed this in her H-S:

> "For crucial announcements from the school, if we found parents did not reply in the groups, we'd follow up with them and make sure that they've seen it and replied. "

4.2.2   H-S group chat opens an accessible channel for parents to speak up. When interviewees and survey participants were asked how H-S group chat had been helpful, accessibility to parents was the number one benefit identified. For example, T5 expressed:
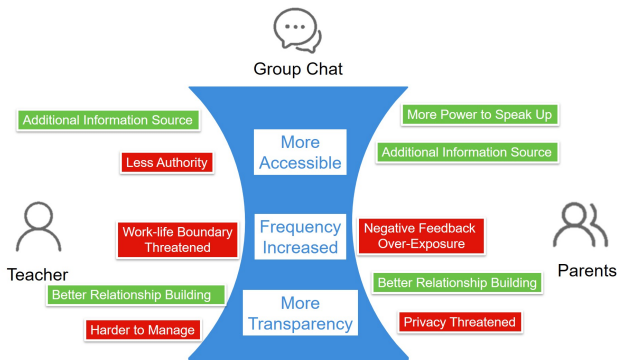
Figure 2: How H-S group chats have changed H-S communication

"I think WeChat has greatly changed my way of communicating with parents, for it was so handy and everyone was just using it for everything. We've tried some other applications in our schools, but none of them worked as well as group chat."

This is consistent with prior work, which stated that WeChat is the most standard way for communication in China [59]. As IM tools such as WeChat and QQ are among the easiest ways to connect with parents, their popularity comes as no surprise. In contrast, while email has been reported as the most adopted H-S communication channel by studies conducted in Western culture, none of our participants reported using it at all.

Traditional H-S communication suffers from "one-way traffic"[28], in which schools send information to parents but it is much less common the other way around. As noted in Table 3, those H-S communication channels which afford two-way communication are all one-on-one, which often requires additional efforts from the teachers and are thus used less frequently. H-S group chats, on the other hand, are one of only two channels that afford both broadcasting and two-way communication. Compared with semi-annual parent-teacher conferences, H-S group chats allow two-way exchange to take place on a daily basis. Unlike Facebook groups or applications such as ClassDojo, IM group chat provides a seemingly viable channel where parents' voices are technically not restricted; that is, parents can initiate a conversation at any time without any action from the teachers.

Both our teacher and parent interviewees agreed that such a mechanism allowed for much more prompt information exchange. A common example of this type is follow-up questions. For example, T7 recalled:

If something is unclear about my instructions or the kids missed some parts of it, parents would bring them up in the group. Prior to the introduction of WeChat groups, we often needed to deal with the mess [of the confusion] the next day."

Our observation result also confirmed this, as parents were often seen to bring up their questions, which usually got smoothly resolved.

In addition, parents themselves could serve as an information source for other parents by providing information of their own. T6 acknowledged:

"Sometimes when I did not see the messages from my phone, I would see the questions already got answered by other parents. I do feel grateful for those who volunteered to do so!"

Parents noted that the informal, lightweight nature of IM group chat lowered the threshold for initiating communication. Compared with making phone calls, they felt much more comfortable asking questions in IM group chat. P15 noted:

Sometimes I want to know if school is over so that my partner and I could coordinate picking up my kid. However, I think it is too much to call the head teacher only for this. That could make me look like a troublesome parent. Therefore, I'd ask in the group, and other parents who are also picking up their kids would share this simple information."

However, both parents and teachers had concerns for this open channel in which parents could speak up so freely. Teachers noted the difference in the number of parents and teachers in the group, with a typical H-S group chat consisting of up to 10 teachers and 50-60 parents. T3 recalled her experience of "being overwhelmed" in her H-S group chat: "*The thing I worried about the most is when they [parents] 'united' and became defiant. One would speak, followed by another, then a third... I could not type so fast since I was still trying to respond to the first.*" This is especially worrisome for young teachers, who feared their authority could be further undermined in the group due to their age and lack of experience. T2 even admitted, "*I only speak [in the group] when I have to, so that I don't make mistakes*".

Parents, on the other hand, often expressed concerne about the associated consequences of "being honest". P1 said:

"Speak up in the group chat? I'd rather not. I do not want to offend my kid's teacher. For things like the amount of homework, I fear it would be useless even if I speak up. It would do nothing but lead the teacher to think of me as a 'troublesome parent'."

In addition, the textual nature of IM communication lead parents and teachers to be more careful with the wording, fearing that accidentally using imprecise language could lead to misunderstanding and even more undesirable consequences. For instance, P5 commented that, "*So many people are watching you! That could be a shame. I don't want my kid to be influenced*".

4.2.3 H-S group chat increases communication frequency. Among the existing H-S communication channels, IM-based groups seem to be the only one that affords both broadcasting and two-way communication. With the advancement of these chats, the frequency of H-S direct interaction has increased significantly. For example, all but one parent received messages from the group chat at least once a day, if not multiple times per day. Our survey results also confirmed this: 56.6% of the surveyed H-S communication groups were active on a daily basis. This contrasts sharply with the use of other channels, especially those that allow for interactive two-way communication; interviewees reported using these much less often. Five out of eighteen parent interviewees reported that they could

not recall a single instance when they and their child's teachers communicated individually in the previous semester. This distribution of usage is potentially related to the less-frequent efforts by the teachers to use one-to-many (or broadcasting) channels. Our teacher interviewees described tools such as IM group chat and mass-texting software would save them tremendous amount of time, for them being "accessible and convenient".

Prior literature noted that a lot of home-school communication was triggered by negative academic performance or inappropriate class behavior, leaving parents overwhelmed when teachers reach out [17]. Our parent interviewees confirmed this, as one joked that her heart "skipped a beat" when seeing a teacher's incoming call. With a higher frequency of communication in H-S groups, teachers are able to share more detailed information about their students, including things that are more positive and lively. Moreover, IM tools such as WeChat and QQ offer rich media features such as photo and video sharing, which made the sharing of positive news more convenient. T2 recalled that she would share with parents of Grade 1 students how they were eating during lunch time. T2 said:

> "I found that this is what the parents cared about the most. By taking photos and videos during lunch time, I could easily assure them that they are doing well".

Our observation results further confirmed this – the head teacher not only shared photos of major events (e.g., art festival, school sports competition), but also occasionally showed what students were doing in the classroom. Encouraged by these lighthearted posts, parents and teachers felt comfortable enough to share jokes and small talk; this was not very common in traditional H-S communication channels.

Our results showed that H-S group chats have, practically speaking, solved the challenge of infrequent H-S communication. However, such a significant increase in frequency could also bring in new problems. Over-exposure to negative news and teachers' management of boundaries are two major ones that stand out in our research.

As mentioned before, with the increase of frequency in H-S communication, teachers shared much more positive information about students than before. However, this does not mean that negative information was no longer shared. In fact, it is quite standard for teachers to share overall academic performance in these H-S group chats. Figure 1c is an example of this; here; the teacher explained how students did in a recent Chinese quiz. While this particular example did not single out individual students, that type of information disclosure is not uncommon according to our interviewees, raising potential privacy concerns that we will discuss in later sections. P1 shared her experience in her H-S group – her daughter was sometimes late in homework submission, and thus her daughter's name often showed up in the group chat listed among those with "late homework". P1 said:

> "I know she was late for homework and I am trying extremely hard to improve that. However, it was not possible to change that overnight. Thus, listing out her name is not going to work. I would be OK with [putting up daughter's name] once a week as a reminder, but on a daily basis, that is obviously too much. "

The second challenge of high-frequency H-S communication is related to the teachers' management of their work/life balance. Instant messengers like WeChat and QQ both afford real-time communication, which means messages could be sent and received in after-work time for teachers. Teacher interviewees reported it was very common for them to reply to the group after work. This was further confirmed by the author's observation results, as there were indeed times that teachers still needed to provide lengthy answers even after school hours and on weekends.

T5 vividly recalled her experience of having parents asking her math problems during the weekend. T5 said:

> "I was cooking for my family back then but had to stop immediately. I know that I didn't have to do it, but was driven by a sense of responsibility, that I had to do it. Otherwise, I'd feel guilty of myself for not reaching out."

T6 added:

> Sometimes I do doubt if it was appropriate for them to send messages like that in weekend time. But how can I not reply? The parents would easily know that other teachers would perhaps reply in situations like this, which would bring additional pressure to me."

Teacher participants also reported several ways that they managed their work-life boundary. Some chose to use a WeChat account specifically for school issues; others would block H-S group chat and only check for messages at specific times.

On a side note, we wondered if information overload could be a big issue for H-S group chats, since it was common to group chats in general. However, we surprisingly found that parents and teachers had almost no issues handling them. Parents were either paying close attention to H-S groups as they pin these groups to top of their chat list, or check in several times a day to stay on track with the information shared in the chat.

4.2.4 Transparency vs. Privacy. With the increased frequency and open channels of H-S communication, parents enjoyed an unprecedented level of transparency regarding how their children and teachers are doing at school. Through such intimate, regular communication, we noted that parents and teachers were able to establish a good sense of empathy and understanding towards each other, which was beneficial for the relationship-building between parents and teachers. For example, P2 has described how he started to understand teachers' rationale by observing their work in the group chat. P2 reflected:

> "If not for [the group chat], I would not know how naughty the boys were. I felt it was actually hard for a teacher to not lose her temper. That ain't easy; I now get it."

Such an understanding could, in turn, impact rational decision-making when parents and teachers were choosing methods of communication. Both expressed that they were trying to use that which would work best for the people on the other side, or even to choose no individual communication, if that would work the best. For example, P4 described her rationale of initiating fewer contacts with her child's teacher.

Yeah, if I could leave the trouble to myself then I'd rather not bother the teachers. I don't like that. You know, I could tell from these chat groups…that they were already so busy with school. They have their own lives too. "

The high level of transparency, however, could also lead to the undesired compromising of students' privacy. Interestingly enough, our survey results on the teachers suggested **all 210 of them** were aware of students' privacy in H-S group chats and had taken some actions to protect students' privacy. The most common ways to ensure students' privacy was to avoid sharing anything "sensitive", such as exam grades and rankings in the group. However, teachers seemed to be much more tolerant towards "less sensitive" issues such as quiz grades, or homework feedback. Another common approach involved using student ID numbers instead of names when listing out students in the group, or to blurring names (with student IDs only) if they were to take a photo of a printed grade sheet. Teachers also took into account student feelings, as some revealed that they only listed out names for those who did well on the exam.

T8 vividly described how she used a combination of techniques to deliver her message with the best efforts to protect her students' privacy. T8 said:

> "Now it is required [by the school and government authorities] that exam scores cannot be displayed publicly in the group… So every time after an exam, I'd announce in the group chat, like, we had just had an exam. Here were students who did a good job, and here are the mean score, etc. When I said this, it was like, almost trying to imply to the parents whose kids score was below the average. I was like, hey, you should go and see if your kid's score is above average. Or I'd send feedback for the homework; I knew this could be publicly sent (unlike the scores). If the kid completed the homework, I'd draw a circle beside his/her name; if not, I'd put a cross. I know that this is sharable. I send this so that parents can see how much homework their kids have missed."

Despite teachers' awareness and efforts to protect students' privacy, there existed a gap between parents' expectation of privacy protection and teachers' current actions. The aforementioned approaches were also adopted in our parent interviewees' H-S group chats, but many of them did not deem these approaches to be sufficient. P10 recalled an incident when her son's homework was shown in the group:

> "That time, he submitted a really bad assignment. The head teacher then sent several good examples of homework along with several bad ones. His was obviously there. The teacher did not include his name and it was just the bad homework being shown. I understood that the teacher did not mean anything personal towards my son and that other parents perhaps would not know, or would not care whose homework this was, but I just cannot help feeling uncomfortable."

5 DISCUSSION

Our study showed that IM-based H-S group chats provide a practical solution to increase the frequency of H-S communication, and to open up channels for parents to speak up so that the communication remains two-way. The synchronous, quicker, turn-taking nature of IM, the media richness afforded by these communication tools, along with the shared space, with all the teachers and parents together, bring in a number of benefits. However, we also encountered some challenges in this brand new context, some of which were deeply rooted within Chinese traditional culture.

5.1 "Teacher authority" culture vs two-way Home-School collaboration

Our findings demonstrated that the authority of teachers is deeply rooted in Chinese culture, making it harder for parents and teachers to establish a cooperative two-way relationship. Even in a seemingly open context such as the WeChat group chat, parents still exhibited concerns about opening up. This finding is consistent with the previous literature - parents typically respect the authoritative teachers because they believe that "professionals are more knowledgeable than parents in understanding the needs of their children" [40, 54].

However, we also found that the H-S group chat provides a buffer to the effect of the authoritative teacher. Parents are somehow "empowered" because theoretically they have a chance to speak up as the teachers do. Some teacher participants reported that they were worried that their authority might be weakened, thus making the whole H-S relationship beyond control.

5.2 Specialized tool for Home-School communication vs. generic communication tool

Another important finding is that communication tools like IM and group chat, which increase the frequency of home-school communication and the class-wide transparency of student information, are still perceived to be unsuitable by teachers and parents, in some situations. For teachers, their work/life boundaries are blurred; for parents, they are sometimes exposed to negative feedback and can be forced to disclose personal information about their children to everyone in the group.

These problems were not first identified in our paper. In fact, there is already a large body of literature discussing ways to establish boundaries in a teacher's working life[5, 25, 33], and lots of helpful advice about this. The research and industry community has also designed specialized tools for home-school communication, such as ClassDojo[2], Wilma[33], which have been designed to manage boundaries and protect privacy in a positive and professional way. But our study finds that while there are specialized communication tools with new boundary rules for teachers, these tools are not widely used. The most common tool of home-school communication in China is simply general IM with a basic group chat function. On one hand, it is probably because WeChat is China's largest IM software, it has robust technical support, and is more applicable, available, and stable than specialized software. In the US, it has also been reported that e-mail is most commonly used,

even though other specialized tools are available[33] ; on the other hand, this also demonstrates that work/life boundaries and privacy problems in Chinese collectivist culture[30] is not the key factor that determines which communication tools teachers use.

As a proverb compares the teacher to a candle that "burns" itself to shed light on the students, in Chinese culture a teacher is always treated as a respectful and high-moral giver rather than a simple employee. Therefore, teachers are expected to continue responding to students' and parents' requests even after working hours, leading to a potential conflict when trying to manage the work/life boundary.

Also, regarding privacy issues such as students' achievements like scores and rankings, deeply-ingrained cultural traditions come into play. Since ancient times, China has a tradition of directly publishing scores and rankings to all the people. This was considered a good mechanism for the transparent transformation of selecting officials through educational achievement. In recent years, influenced by contemporary trends in Education reform and Psychology, China has gradually implemented more policies to protect students' psychological conditions.

But, the same time, the needs of accessibility, ease of use, efficient home-school cooperation to solve the students' problem is considered to be even more important, while the difficulties of teachers' work-life balance and students' information privacy issues tend to be supressed.

5.3 Design implications for Home-School group chat

From our study, we can see that general IM and group chat software meets Chinese teachers' and parents' demands by being more accessible, easy to use, stable, and efficient. For this use, it is very difficult to make specialized software, which would need to be specially designed, with complicated rules for H-S chat groups. However, we should not ignore that teachers and parents are facing temporarily-suppressed problems and unmet needs when using common communication software: namely, the teacher's work-life balance and student privacy issues.

Therefore, we suggested future design should focus on communication tools that can be integrated into WeChat. For example, these tools can include conversation summarization, structuring, visualization tools that help save teachers' time[15, 16, 58], NLP-based detection tools with prompts which help teachers check information being sent for privacy issues, and emotion regulation tools preventing teachers and parents from repeated negative feedback exposure[35, 45].

These tools can help teachers and parents be more efficiency on regular task in the group and can be sensitive about teachers and parents' emotion about negative feedback, and lighthearted a good way to manage home-school chat groups. We also recommend designing tools in group chat to help parents and teachers set up rules of communication and privacy protection, which can also help teachers to maintain boundaries of work and life.

6 CONCLUSION

In this paper, we conducted a mixed-method study to examine home-school communication in China. Among the variety of

channels parents and teachers adopted for communication, instant-messenger-based H-S group chat stood out. Given that these IM-based group chats were both lightweight and open-ended, they show promise in solving two persistent challenges in H-S communication: 1) the low frequency of communication, and 2) that the communication from the school is primarily one-way. While IM-based group chats have quickly gained popularity and, therefore, have proved their effectiveness in practice, we found negative issues alongside the benefits. Challenges such as information overload, lack of privacy, and the blurred boundary between work and life for teachers warrants attention in both academia and industry. We hope this exploratory study will shed light on future work, with quantitative research to validate how H-S group chats work and to suggest interventions to improve the state of the art.

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