
WithDorm: Dormitory Solution for Linking Roommates

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Abstract

Experiences in universities are important for emotional maturation and offer an opportunity to develop individual characteristics and skills needed for social life. There are diverse issues affecting the quality of dormitory life and roommate relationships, which can influence one's psychosocial development. In this paper, we propose WithDorm, a mobile application to help communication with roommates and tighten their connections, and thereby assisting the users' emotional health and psychosocial development. We analyzed dormitory roommate issues from a human-centered perspective and narrowed down to three design implications after dormitory life modeling. Furthermore, we implemented the design implications in a prototype and performed a usability test to evaluate and improve the design. The final design, WithDorm, is aware of dormitory-specific concerns, collects and adapts to users' lifestyles, and initiates human-human interaction among roommates.

Author Keywords

Dormitory life; Roommate relations; Conflict resolution; Initiative solution; Contextual design

ACM Classification Keywords

H.5.2 [User Interfaces]: User-centered design, Prototyping;
H.5.m [Information interfaces and presentation (e.g., HCI)]:
Miscellaneous

Chickering and Reisser's seven vectors of identity development

- 1) Developing competence
- 2) Managing emotions
- 3) Moving through autonomy toward interdependence
- 4) Developing mature interpersonal relationships
- 5) Establishing identity
- 6) Developing purpose
- 7) Developing integrity

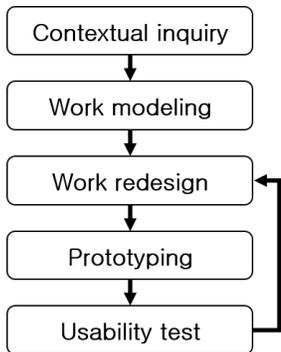


Figure 1: The design process of this study.

¹<http://www.chorma.com/>

²<https://www.wunderlist.com/>

³<http://www.todyapp.com/>

⁴<https://www.splitwise.com/>

Introduction

Universities are not only an academic institution, but also they offer the experiences for formation of one's mature emotional development and social functions. It is the point of turning from adolescence to adulthood during which important social skills and self-conception are nurtured. As Erikson's theory of psychosocial development suggests, forming an intimate relationship with others at this age contributes greatly to subsequent personal satisfaction [10]. In addition, according to Chickering and Reisser, achieving a mature interpersonal relationship with others is one of the seven "vectors" in psychosocial development issues faced by college students, and is an important task for college students who are on the verge of growth [2].

Besides, in 2014, 73 percent of public four-year, 66 percent of private four-year colleges, and 18 percent of public two-year colleges offered on-campus housing in the United States [3]. Dormitories have representative characteristics of a community in terms of both physical space sharing and psychological bonding [8, 14], and the quality of life in dormitories greatly influence the students' psychosocial development. More specifically, it is the place where they learn the sense of responsibility, consideration for others, and cooperation with their roommates. While the relations with one's roommates are important for healthy university and social lives, conflicts and issues are many and diverse [6]. Helping to build healthy relations with roommates may cultivate the social skills required for building mature relationships and adapting into future communities.

Much research has been conducted to analyze roommate conflicts and provide solutions [4, 6, 7, 11]. Although these solutions help one's effort in understanding others and gaining an objective perspective of a relationship, they are limited in that the effort may not be mutual and the under-

standing may not lead to specific actions. There are also increasing number of solutions that create new networks and virtual spaces, thanks to the advances in the Internet, digital resources, and smartphones technologies [1, 13]. They allow users to assign and claim house chores¹, share shopping and to-do lists², keep track of basic household cleaning tasks³, and split rent and utilities⁴. However, such solutions tend to be oriented for task completion and determining a person in charge, which may in fact, contribute to less communication and reduced relations among roommates.

The goal of this research is to leverage these technological skills to facilitate communication among roommates and tighten the connected ones. We propose WithDorm, a specialized application designed to find issues in dormitories and help solve the conflicts among roommates. WithDorm is aware of dormitory-specific concerns, collects and adapts to user's daily schedules, and initiates human-human interaction among the roommates.

Research Methodology

Our research was conducted in four steps: investigation, design, implementation, and evaluation. The methodology adopted in the investigation stage is contextual inquiry [15]. Contextual inquiry is a qualitative research method for determining design implications. We adopted this open survey method because it allows flexibility in the inquiry according to the context. This is an advantage over quantitative methods that often restricts inquiries to be made in a fixed predefined frame. Based on the user responses, we created a dormitory life model, identified common causes of conflict, and designed a system that provides a solution. After implementing the prototype, we evaluated the system effectiveness using think-aloud evaluation method [12]. We performed one iteration of contextual design workflow,

Focus statements

Everyday Life (Focus 1):

Where do roommates eat during the weekdays and weekends? How do they manage common space including living room and bathroom? Where and how do they manage laundry and cleaning?

Social Relations and

Communication (Focus 2):

How do roommates communicate with other people in the dormitory and/or with their roommates? How do they contact their family? What kinds of interaction do they do with friends, colleagues, and professors in the university?

Study and Hobby

(Focus 3):

When there is no class, what kind of activities do roommates like to do? Where do they study? How do they use the dormitory space?

<i>Focus statements</i>	<i>Key finding</i>	<i>Design implication</i>
Focus 1	Chore distribution in the common space management and cleaning are frequent causes of conflict.	How can we distribute common chores and reduce the conflicts between roommates?
Focus 1, 2	When issues arise, roommates do not talk about it because they want to avoid uncomfortable relations with their roommates.	How can we help roommates become aware of the issues and raise sense of responsibility without directly complaining?
Focus 2, 3	Roommates often have different life styles, and since they do not share each other's schedules, it is awkward to suggest a common activity.	How can we help roommates share necessary schedules and encourage common activities to build friendly relations?

Table 1: Key findings and design implication using contextual design.

which is shown in Figure 1. The rest of the paper describes each process.

Focus and Key Findings

In order to derive the inquiries, three investigation focuses were defined: "everyday living," "social life," and "study and hobbies". These focuses were selected to cover a variety of possible perspectives in dormitory life. They were set to minimize the designer's bias and intervention of personal intuitions, while gaining a holistic view during the investigation process. We visited two different campuses in Seoul National University in South Korea and examined the dormitory space. Furthermore, we observed six students' behavior in detail. By speaking informally with them, we tried to understand their viewpoints and identify their needs. Throughout the investigation, the user responses were analyzed from various perspectives so that macroscopic tendency can be captured. Follow-up inquiries were adapted in real time based on the initial responses and observations of their behavior. Throughout the research, we aimed to

keep a human-centered rather than technology-centered perspective in order to ensure the application will initiate bonding with the roommates beyond the task completions.

Based on the user responses, we created flow and sequence models of a dormitory life and analyzed the phenomenon. The biggest problem revealed here is that conflicts over the sharing house chores cause a break in communication between roommates. Three key findings for each focus were derived, which is summarized in Table 1. We identified the common causes of conflict and ideas for roommate relation building: 1) house chore role and responsibilities, 2) lack of communication to discuss common tasks or suggest activities, 3) awkwardness in notifying each other's schedule and events, which can be mutually useful information.

Design Implication

Based on the key findings in Table 1, design implications were derived to resolve conflicts among roommates. In

Quotes from contextual inquiry answers

"We rarely even say hello to each other. I mean, who actually talks to their roommates?"

"I really wish my roommate will learn to clean up his own mess, if not others. I cannot bear it and end up doing all the cleaning by myself."

"I hope to get to know my roommate, but we have different schedules and I don't know when is the best time to suggest something together."

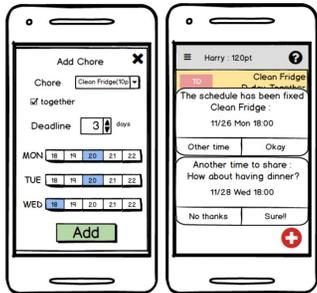


Figure 2: The prototype of the proposed application.

WithDorm, we propose three design implications. The first two aims to resolve issues regarding house chores and facilitate communication, and the third implication aims to connect individual roommates beyond dormitory space.

Our first design implication based on the first and the third key finding is to design a system where users can propose a shared house chore to a roommate at a mutually convenient time. This system reduces causes of conflicts among roommates by making use of available schedule information and suggesting a necessary chore. Roommates can assign points for each housework, and decide who is responsible for the work or also do house chores together. A contribution visualization system ensures that the role and responsibility can be effectively distributed among the roommates. When a house chore is complete by one of the roommates, this event can be shared with other roommates by recording the type and amount of house chore load. This feature plays a role in effective distribution of common workload in the shared space.

The second design implication, which is based on the second key finding, is a notification feature which sends a message to the user when the amount of contribution to the common space falls below the predefined unbalance threshold. This implication was derived in order to resolve the lack of communication opportunity issue we found and encourage voluntary contributions before conflicts happen.

The last design implication initiates bonding beyond house chore level. We added a feature where users can propose a shared activity to a roommate at a mutually convenient time, such as ordering food, shopping groceries, and exercising. Key findings show that although users would like to get to know their roommates, they find it awkward to suggest something new beyond house sharing level. Since their schedules are shared in the first design implication, we

extended the feature by enabling open suggestions of other activities of interest.

Prototype & Usability Test

We implemented the design implications in a mobile application using Balsamiq Mockups 3. Figure 2 shows the prototype. Usability test was conducted in order to evaluate the effectiveness of the proposed system in resolving house chore related conflicts and encourage friendly relations. The goals of usability test is as follow:

- Check the system can increase common activity satisfaction and bonding connections.
- Check the system can help effective distribution of house chores and alleviate existing discomforts.
- Check the notification and common activity suggestion feature can help strengthen a friendly connection between roommates.
- Identify points of improvement in the system including user interface design.

Six potential users were asked to complete five tasks: proposing a common house chore activity to a roommate, confirming the proposed activity, submitting a weekly schedule, checking other users' contribution level, and completing a house chore after receiving a notification message. Think-aloud evaluation method was used during the tasks in order to see how the prototype can be improved.

Results

Usability test results show that all participants find the WithDorm prototype effective in reducing house chore related conflicts and bonding with their roommates. According to their think aloud feedback, the prototype can be improved by making the notification alarm more friendly; one participant expressed that receiving notifications on chores may

Quotes from users' feedback

"The process of proposing a chore and scheduling the activity itself felt like I was talking to my roommate and really communicating."

"The chore notification feature can be annoying if we receive too many messages."

"I already use Google calendar application and if WithDorm can synchronize with the app, it will save me from duplicating the job."

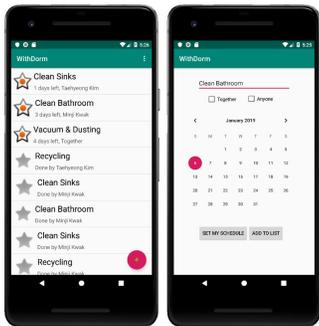


Figure 3: The final design.

feel burdensome and may hinder users from using the application. Another participant said the schedule submission process could be simplified by synchronizing with an existing calendar application they already use. Moreover, we received feedback relating to the interface. They were implemented in our final design, which is shown in Figure 3.

The strength of the proposed design in WithDorm is three-fold. First, it considers users' daily schedule. The existing solutions are task-specific and does not take into account when the users are available for the task. By incorporating the schedule submission feature, WithDorm ensures that the tasks can be complete without intervening with the roommate's daily life while increasing the feasibility of the task completion by checking schedule availability first.

Moreover, WithDorm helps young individuals to cultivate a sense of responsibility and cooperative spirit. We believe that the root cause of the key findings are cultural, as university students gather after having spent most of their adolescent lives with parents who take care of the house chores. This is true especially in South Korean families that put higher priority in achieving high performance in the university entrance examination for their children rather than having them cooperate in housekeeping activities. WithDorm seeks to raise the awareness of being a responsible roommate by introducing the contribution balancing feature and encouraging voluntary participation, which is a new idea that can differentiate our work from other similar applications.

Third, WithDorm reaches out to roommates. One of our concerns in deriving the design implications was that using the application may in fact hinder face-to-face communication between roommates by enabling them to get the chores done separately. By extending the features beyond dormitory space into individual lives, ranging from food,

shopping, music, and hobby sharing, we hope WithDorm will be an effective initiator that enriches users' dormitory lives.

Conclusions

We propose WithDorm, a mobile solution for improving college dormitory life with roommates. It aims to resolve existing conflicts regarding house chores and initiate interactions with users' roommates. The methodology was chosen in order to realize a human-centered solution more than a technical application. In order to achieve our goal in an unbiased way and ensure that the application is reflective of the realistic needs, we first set three different focuses as the starting point of contextual inquiry. After dormitory life modelling, key factors that cause conflicts and may contribute to tighter connection were identified. Initial design was proposed to resolve house chore related issues and encourage further shared activities, which was implemented into a prototype. For the final design, we improved the prototype regarding notification feature, calendar synchronization, and user interface, which were the points identified from the usability test. Although it is necessary to evaluate effectiveness for strengthening communication in long-term dormitory life, the results show that WithDorm helps to alleviate dormitory chore issues while encouraging personal bonding with roommates.

Through decades of research, one of the most essential elements of a happy life is the social relationship [5]. Especially people feel the greatest pleasure when interacting with others during the day [9]. We believe the proposed solution not only helps to connect the young individuals together in the dormitory space, but also assist their psychosocial development during their university lives and a happier life after.

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