A Study on Behavioral Characteristics and the Scale of Activities in Day Service Centers for the Elderly in Taiwan: A Case-study of Two Mixed-care Type Day Service Centers

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Abstract

This study applies behavior setting theory, and conducts an observation survey at ten-minute intervals of behavior mapping records by tracing the behavioral contents, interaction conditions and activity types of the elderly, trying to break down behavioral characteristics and an activity scale into two mixed-care day service centers (DSCs). Remarkable behavioral characteristics noted are as follows: Participants have various interests, particularly some less frail elderly whose interaction patterns are regarded as "active", and they are not satisfied with staying in one limited space all day long and require diverse activities. Participants with dementia, however, have interaction patterns that are "passive" and are often in a daze and do nothing when activities are held, showing a requirement for a place for wandering. Five items are presented as suggestions for the design of a mixed-care DSC: (1) Reducing the distance between user spaces when planning floor layouts; (2) Considering and offering the possibility of different activities and an activity scale held at the same time in the day room; (3) Designing in a manner that answers the need for wandering; (4) Providing ample and barrier-free spaces in corridors, passages and the courtyards, and (5) Providing plural toilets with easy access.

Keywords: elderly; Day Service Center (DSC); behavior setting; behavioral characteristic; activity scale

1. Introduction

The population of Taiwan was over 23.2 million in 2008, while the percentage of the elderly was 10.7% at the end of 2009. Life expectancy lengthened by almost twenty years in the past two decades and was 77.9 years in 2006. (Department of Statistics, 2006)

With the aging of our society, living and care of the elderly has become an important subject in the country’s development. The 10-year Long-Term Care Plan in 2007 noted that institution resources are oversupplied; however, in terms of community-based care, particularly day service, there appears to be a huge gap between demand and supply.

The Day Service Center (DSC) in Taiwan was started in 1985 but is still in the molding process. It has passed through many experiments and the pattern of care it provides reflects a wide diversity. At the end of 2008, in a countrywide survey only thirteen among 25 counties and cities enforced day service. With great difficulty, it has finally been confirmed that day service is a service aimed at caring for the disabled and dementia elderly to support them in their aging, and there is also the anticipation that long-term care cost will be reduced and the lifespan of the elderly living in the community will be prolonged as much as possible.

Though the government and academics have become concerned with issues relating to DSC and have implemented some investigations, the majority of these concerns and investigations center on social welfare, medical care and nursing; only a few researches have examined the impact of the physical environment and the space demands of the elderly.

The DSC should provide space that is user-centered. Researchers have identified many differences between the elderly with disability and those with dementia. However, half of the DSCs in Taiwan are of a mixed-care type, mingling the two groups together and caring for them under the same circumstances.

Are the behaviors and preferred activities of disable participants the same as those with dementia? What is the interaction situation between the two groups? And what are the users' demands in terms of the quality of space that should be provided at a mixed-care DSC? In order to answer these questions, this study applies behavior setting theory and conducts an observation survey at two mixed-care DSCs with a different physical environment (i.e., a single-type and compound-type DSC) The ultimate goal of this study is to attempt to outline the topics and orientations of space which should be carried out by DSCs in the future.
2. Review

2.1 The Development of Day Service in Taiwan

The first known Taiwanese DSC was the Songbor Recreational Center, which opened in Tainan City in 1985, supplying recreation and leisure service for the independent elderly. This DSC was based on a social model of caring for the elderly. In 1990, however, Provencal Fong Yuan Hospital established a Day Care Center (DCC) within its hospital to provide day care to patients with chronic diseases, thus establishing a DSC based on a medical model of providing care for the elderly.

In general, there are two types of day service center in Taiwan: those based on a medical model and those based on a social model. The former kind of DSCs provide medical facilities and rehabilitation and are supervised by the Department of Health. The latter kind of DSCs mainly provide meals and recreational activities and are governed by the Ministry of The Interior.

The developmental process of DSCs in Taiwan has been from top to bottom. Furthermore, the implementation of day service has varied and has been strongly impacted by the two different administration systems. Wang (1997) considered that before 1999, day service in Taiwan was mainly provided for the healthy elderly: leisure activities and lunch were the main services, whereas after 1999, the Ministry of The Interior positively enforced day service, and the concept shifted from health maintenance to caring for elderly with various disabilities.

Statistical data shows that there are 75 DSCs, and over 50% (38/75) of these are termed mixed-care type as they have disabled elderly mingled with dementia elderly (Ministry of The Interior, 2007). Service patterns reflect a wide diversity: some DSCs only supply service in the morning; some only open three days a week. The operators are classified into the public sector, non-profit organizations (NPOs) and the private sector. DSCs are also divided according to their location: compound-type (DSCs located within a building) and single-type (DSCs that operate entirely alone).

2.2 Theoretical Background

The field theory of K. Lewin (1943) states that human behavior is the result of an interaction between people and the environment. R. Bark (1968) emphasizes that behavior setting is considered to be a stable combination of activity and place, and provides a behavior setting conceptual framework from which to examine the relationship between environment and behavior, advocating understanding of the human needs to be observed and surveillance in the daily living environment. John Lang (1987) considered that behavior setting consists of four characteristics: "a recurrent activity, a particular layout of the environment, a congruent relationship between activity and a specific time period."

Wicker (1992) considered that behavior settings are a small-scale social system bounded by time and place and composed of people and physical objects. At the same time an essential phenomenon of this interaction is the behavior-environment "synomorphy", or the "fit" relationship between the behavior of the people, their characteristics, and the arrangement of physical objects in the setting. (Wicker, 1987)

2.3 Related Research

Cheng's research (2002) was based on the concept of behavior setting: comparing the contents and specialty of the elders' social behavior within two senior apartments, it explored the relationship between social behavior and the surrounding objects. Liu (2005) surveyed and analyzed the facilities, care pattern and activity types at three DSCs in Taipei: basing his research on the concept of unit care, he remodeled one DSC and evaluated the effects after this change in physical environment. Chen (2007), using a questionnaire to survey the living space of three DSCs in a social administrative system, suggested that a DSC with a single-floor structure may provide the best quality of care as it prevents the need to move up or down to other floors in the building.

Anita Blanchard (2004) applied the theory of behavior setting from the perspectives of time, place, objects, participants and the setting program to explore the characteristics and interactional pattern of behavior setting in a virtual community. Tobari et al. (2002) focused on activities and the scale of the activity group to discuss the space structure of DSCs: they closely observed and interviewed 11 facilities to complete the survey. Nishino et al. (2004) used on-site observation and interviews to examine the characteristics of space usage and discussed the limitations of four mini-DSCs: results suggested there should be two types of centers, namely, "health promoting centers" and "houses for the elderly with dementia." Kato et al. (2004) focused on the concept of place: promoting the viewpoint of "place units", they analyzed and compared the characteristics and problems of the elderly at two DSCs with different activity programs.

3. Methodology

3.1 Research Purpose

This study has four main purposes: (1) To analyze the usage pattern at two mixed-care DSCs from the perspective of behavior setting which includes the kinds of activity, activity group scale, and arrangement of furniture in the physical environment; (2) To examine the ways in which the participants at DSCs behave under different ADL levels, including the behavior contents, interaction patterns, and scale of the activities; (3) To explore the problems of different architectural types, that is, single-type and compound-type DSCs. (4) To conclude the variables that impact on behavioral characteristics, interaction patterns and the scale of activities.
3.2 Survey Setting

Actually, it is difficult to find two DSCs falling under the same operating sector but differing just in physical environment. After a pilot study, this study conducted a field survey at two mixed-care DSCs: the DSCs were chosen based on the criteria of location, district, architectural type, and the willingness of organizations to participate in our study.

L-DSC is in a rural district in Kukeng Town, and was established in 1999 after the 921 earthquake. It is an independent facility run by a civil non-profit organization. The building, renovated from an unused elderly center, is a traditional U-shape san-ho-yuan, has a space measuring 436.4m² and comprises of an office, day room, nap room, kitchen, bathroom and courtyard (Fig. 1.). At the time of this study, the majority of participants lived alone, were low-income and over 65. There were 28 elderly (5 males, 23 females) at the center, with an average age of 82 years. Ten of these elderly had dementia, one used a walker and 4 used canes for movement. L-DSC opens from 8:00 a.m. - 4:30 p.m., has activity programs between 9:30 a.m. - 4:30 p.m., and a rest time from after lunch until 2:00 p.m.

On the other hand, T-DSC is attached to a welfare institution located in an urban district in Taichung City. The DSC was formed through renovation of an old homeless shelter, has a space measuring 206.5m², and comprises of a dining area, activity room, nap room, and bathroom (Fig. 1.). At the time of the study, participants were limited to those who lived in Taichung City and were over 65. There were 15 elderly (6 males and 9 females) enrolled, the average age was 82, and nine persons had dementia. In total, 7 used supplements for movement (4 wheelchairs, 1 walker, and 2 canes).

The normal schedule at the second DSC starts with a health check, and activities begin at 9:30 a.m. Staff members begin preparing lunch at 10:50 a.m., and after lunch participants rest in a nap-room until 2:00 p.m. They then start the afternoon program, which lasts until 4:00 p.m.

3.2 Data Collection

This paper is significant in three ways. Firstly, the study examined the use of the DSC from the perspective of behavior setting. Secondly, it examined the ways that the elderly at a DSC behave under different ADLs, and thirdly, compared single and compound types of DSC, providing a better understanding of how the design of the physical environment can be improved at mixed-care DSCs.

We started by carrying out a focused interview with care staff, to understand the ADL and characteristics of participants, and to collect floor layout and staff data of the L and T DSCs at the end of 2007. In order to trace the behavioral contents, activity types and user space of the participants, we conducted a survey by behavior-mapping at the L-DSC from 2008/2/18 to 2008/2/22, and at T-DSC from 2008/1/28 to 2008/2/01, taking every 10 minutes as one period, and recording the places used as well as the activities of the elderly and staff on the floor layout. As shown in Table 1., there were a total of 109 periods for the L-DSC and 88 periods for the T-DSC.

4. Results

4.1 Behavior Characteristics of Participants

Based on the basic ADL data provided by the two DSCs, the elderly were classified into four groups: independent (IG), handicapped (HG), dementia (DG) and handicapped plus dementia (HDG). We classified the activities into five types during the pre-test according to the kind of stimulus they provided, namely, mental stimulus (a1~a5), brain stimulus (b1~b3), social stimulus (c1~c3), body stimulus (d1~d4), free activity (e1~e5), and others (s1~s3), and detailed the recorded behavior of each participant by sequences of behavioral settings at ten minute intervals.

Table 1. Behaviors of Participants at L-DSC (2008/02/20)

| Time  | M1   | M2   | M3   | M4   | M5   | M6   | M7   | M8   | M9   | M10  | M11  | M12  |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| 0950  |      |      |      |      |      |      |      |      |      |      |      |      |
| 1000  |      |      |      |      |      |      |      |      |      |      |      |      |
| 1010  |      |      |      |      |      |      |      |      |      |      |      |      |
| 1020  |      |      |      |      |      |      |      |      |      |      |      |      |
| 1030  |      |      |      |      |      |      |      |      |      |      |      |      |
| 1040  |      |      |      |      |      |      |      |      |      |      |      |      |
| 1050  |      |      |      |      |      |      |      |      |      |      |      |      |
| 1100  |      |      |      |      |      |      |      |      |      |      |      |      |
| 1110  |      |      |      |      |      |      |      |      |      |      |      |      |
| 1120  |      |      |      |      |      |      |      |      |      |      |      |      |
| 1130  |      |      |      |      |      |      |      |      |      |      |      |      |

According to the results shown in Tables 1. and 2., three common features exist at the two DSCs: (a) The IG and HG participants are able to follow the activity schedules of the DSC, and demonstrate a high homogeneity in their behaviors; (b) Relatively
speaking, the behaviors of DG and HDG participants are heterogeneous: Sf8, Af14 and Af16 were often in a dazed and sleepy condition; and (C) The regulation of both DSCs in terms of participants exhibiting a variety of individual behaviors is flexible: For example, Sf8 at L-DSC was allowed to wander in the corridor and M2 at T-DSC was not punished for going to the barber.

It should be noted, however, that there are two significant differences between the two DSCs: (a) Participants at T-DSC spend more time in movement than those at L-DSC; and (b) At L-DSC, the staff play an important role during activity time, while at T-DSC, TV sets substitute the staff and act as the main tool of control when activities are held.

4.2 Analysis of Behavior Setting
(a) Day Service Center L (Table 3.)

At the single-type L-DSC, all kinds of activities occur in the day room. Static activity comprises of doing handiwork, singing songs, watching Taiwanese Operas, and listening to talks on health topics. While a static activity occurs, the staff and/or directors usually stand in the middle, and the participants sit in their fixed positions at two long tables.

Dynamic activities, on the other hand, include Tai-Chi, health exercises, finger massages, music therapy, and religious activities. While a dynamic activity occurs, the positions and actions of the participants are unfixed and vary: For example, when doing finger massages, the participants form a U-shape in front of the tables; when carrying out music therapy, staff push the tables to the walls and the participants sit in the form of an oval-shape to do activities; and when a special event like the Lantern Festival is held, it is customary to arrange the making of dumplings and lanterns and the answering of riddles by dividing five members of staff and 20 participants into two groups and having each group sit at its own long table.

On the whole, the furniture layout and pattern of space usage at L-DSC can be sorted into three distinct patterns. One involves the use of a U-shape, another arranging the tables in parallel, and putting the long tables against the walls so as to form a vast space in the middle for doing activities.

(b) Day Service Center T (Tables 4. & 5.)

At compound-type T-DSC, the activity space is plural, besides the day room, there is the second activity room and an auditorium. The second activity room can take a capacity of 30 persons. As for the auditorium, it can take a capacity of 150 persons.

The day room is virtually an oblong space. While the front part of this space is a dining area, the back part is a living room with a home-like atmosphere: some chairs form an L-shape before the TV cabinet.

As for the activity schedule, static activities are more than dynamic activities. The static activity "singing songs" involves singing along with the Karaoke recorder; in order to watch the words on the TV; participants sit around the TV. At lunchtime, independent participants have lunch at the tables, while others sit in front of the TV cabinet in their wheelchairs.

The TV cabinet appears to be the center of their daily living since all activities seem to revolve around it. Participants all have their fixed positions; for example, the wheelchair users are always near the TV cabinet. Except at lunch time, there is no change to the arrangements of furniture in the day room.

Table 3. The Behavior Setting at L-DSC

| Date         | Time         | Activity Description                           | Setting Details                                                                 |
|--------------|--------------|-----------------------------------------------|--------------------------------------------------------------------------------|
| 2008/2/22    | 10:40        | Tai-chi Exercises, Day Room                    | The two long tables were set parallel to each other in the front, and some tables were positioned in an L shape. |
|              |              |                                               | The participants sat freely around the tables while the director was on the stage teaching them how to do exercises. |
|              |              |                                               | No. of persons: 15                                                              |
| 2008/2/12    | 14:50        | Watching a Taiwanese Opera, Day Room           | The equipments were set in the middle and on the stage.                        |
|              |              |                                               | The participants sat at the tables, forming a U-shape to watch.                |
|              |              |                                               | No. of persons: 15                                                              |
| 2008/3/6     | 15:40        | Music Therapy, Day Room                        | The long tables were put against the wall to form a wider space in the middle. |
|              |              |                                               | The participants formed an oval shape to do activities, and there were two directors: one stood in the middle and another was part of the circle. |
|              |              |                                               | No. of persons: 20                                                             |
| 2008/2/21    | 11:20        | Special Event, Day Room                        | Only two long tables arranged parallelly and the other tables were moved to the back of the room. |
|              |              |                                               | The elderly were divided into two groups: about ten participants sat around each table for ease in interaction and staff sat beside them. |
|              |              |                                               | No. of persons: 20                                                             |
| 2008/2/19    | 14:10        | Religious Activity, Day Room                   | Two long tables were set parallel to each other at the front and four tables were set in the back. |
|              |              |                                               | There were more than ten volunteers, some accompanied the participants doing sign language, and more in talking and singing. |
|              |              |                                               | No. of persons: 22                                                             |
4.3 Interaction of Participants (Table 6. & 7.)

In this study, "active interaction" refers to social interaction automatically happening among the participants, and "passive interaction" refers to the interaction deriving from the need for care and activity between participants and members of staff.

At L-DSC, the survey results show that "active interaction" happened the most in IG but the least in HG, and while "passive interaction" was common among all four groups, the manner of interaction was very diverse (Table 6.). At T-DSC, on the contrary, the frequency of "active interaction" was less and concentrated in just a few IG participants; "passive interaction" was not popular among all participants (Table 7.).

Comparing the data of the two DSCs, there are some interesting features: (a) at L-DSC, the average "active interaction" and "passive interaction" is popular and virtually happens for each participant, and the interaction patterns are full of diversity; the average frequency of interactions in DG and HDG is not less than in IG and HG, (b) however, at T-DSC, there is less interaction among different ADL level groups; with few "active interactions" among the participants, the interaction patterns exhibit high individual differences.

4.4 Activities and Group Scale

In this study, we classified the scale of the activity group into four levels: 1~2 participants was regarded as personal scale (PG); 3~6 participants, small scale
Furthermore, most activities are of the static type, staff members are the only caring manpower and are mainly dependant on the TV set as an activity tool. The activities carried out are MG and LG. The frequency and pattern of interactions of participants are less and passive.

On the other hand, the single-type L-DSC is a compact U shape building with a courtyard. The building is open and adjacent to a street, thus having good connection with the community. Some dementia participants usually wander in the corridor or courtyard; consequently, it is easy for them to get lost and not easy for staff to care for their safety. In terms of restrictions imposed by a narrow space, L-DSC has only a day room for activity, and over 90% of activities are carried out there; consequently, staff members have to change the arrangement of furniture and layout of equipment in order to answer the needs of activities of different scales.

Although the physical environment at L-DSC is not better than T-DSC, along with the changing of furniture arrangements and layout, L-DSC has a balance of static and dynamic activities in its activity schedule and obtains aid from volunteers. Furthermore, the frequency and patterns of interactions are diverse and the scale of activities varies from LG to MG to PG.

5.2 Space Requirements for Elderly at a Mixed-care DSC

At L-DSC, those with dementia wandering in the corridor are usually accompanied by staff members based on safety considerations. However, in the case of T-DSC there is almost a closed space, with only a short corridor without any wandering path, thus those suffering from dementia often trouble others when activities take place or at rest time. Half of the users at the two DSCs suffer from dementia, and the survey results show that they need a place to take a walk or wander; in the case of those suffering from dementia who are emotional or engage in violent behavior, a quiet place in addition to the day room is needed for staff to calm them down.

Most participants of DSCs have to use canes, walkers or wheelchairs for movement. An environment with barriers would restrain their movements and increase the workload of staff members. Furthermore, those using a wheelchair need staff to assist them in their personal hygiene; however, at L-DSC, there is only one bathroom and it is not convenient for wheelchair users.

5.3 Interaction Patterns under Different ADL Levels

Although the kinds of activities at L-DSC were more varied than those at T-DSC, the survey data noted some similarities in the interaction patterns at both DSCs: (a) HG participants carry out activities according to the schedule; (b) IG participants are the most active in interacting with other participants. However, as they have no interest in a given activity, some of them do not take part in activities, preferring to sleep or doing

Table 8. Activities Scale between L and T-DSC

| DSC Group Scale | Activities contents/periods weekly | Activities contents/periods weekly |
|-----------------|-----------------------------------|-----------------------------------|
| Large Group (over 13) | Static state: singing songs, health lectures, sign language, handwork, Taiwanese operas | Static state: speeches, listen Buddhist, Karaoke (in the auditorium), watching TV (Second Activity room) |
| DSC Group Scale | Activities contents/periods weekly | Activities contents/periods weekly |
| Large Group (over 13) | Dynamic state: music therapy, health exercises, Tai-chi exercises, finger massages, lunch or snack | |
| DSC Group Scale | Activities contents/periods weekly | Activities contents/periods weekly |
| Large Group (over 13) | 75/109 (68.8%) | 13/88 (14.8%) |
| Large Group (over 13) | 18/109 (16.4%) | 7/88 (8.0%) |
| Large Group (over 13) | 10/109 (9.1%) | 6/88 (7.0%) |
| Large Group (over 13) | 8/109 (7.3%) | 5/88 (5.7%) |
| Large Group (over 13) | 6/109 (5.5%) | 5/88 (5.7%) |
| Large Group (over 13) | 4/109 (3.7%) | 3/88 (3.4%) |
| Large Group (over 13) | 0/109 (0.0%) | No |

At L-DSC, the average number of daily attendees was 15~21 persons and almost all attendees took part in activities since there was only one day room for activities (Table 8). Seventy eight percent of the activities were carried out on a large scale (LG) in the day room, only 11% were of a medium scale (MG) as when festival activities proceeded. As there were many volunteers during a religious time, activities at a PG, SG and MG occurred at the same time. After lunch, the participants chatting in the corner by the toilet were SG and MG, while in the second activity room and the auditorium, the participants were often mixed with the residents of the Senior Home, and were always in activities that were LG. However the participants seldom interacted with the residents.

At T-DSC, the average number of daily attendees was 11~12 persons, and generally there were three kinds of activity places, namely, the day room, the second activity room (capacity of 30 people), and the auditorium (capacity of 150 people). Almost all attending participants joined activities in the day room that were MG, while in the second activity room and the auditorium, the participants were often mixed with the residents of the Senior Home, and were always in activities that were LG. However the participants seldom interacted with the residents.

5. Discussion

5.1 The Influences of Physical Environment

Based on the analysis of a survey, we identified some distinctive characteristics between the two DSCs. Compound-type T-DSC is affiliated with a welfare institution: segregated from the normal community, it has an institutionalized atmosphere. It has the merit of sharing the public space with the welfare institution, as well as the day room, and also provides two public spaces for entertainment activities, over 20% of which are held at public activity spaces. However, the two public spaces are a long distance from the DSC, which increases the load of staff members, who spend a great deal of moving the elderly.

When activities are held at T-DSC, the furniture arrangements and atmosphere stay the same.
individual things; and (c) As activities are being carried out, those with dementia (DG and HDG) often wander around, doing nothing or are in a daze. We have determined that the ADL condition is an important factor impacting on the interaction of the participants.

6. Findings and Conclusion

Although this study only surveyed two DSCs, which are different in terms of their location (one is in-house and the other independent) and the results perhaps cannot indicate the exact status of a mixed-care DSC, the study is a small but important step in understanding DSCs in Taiwan. It presents some findings and suggestions, which will be of use to practitioners and researchers.

6.1 Variables Impacting on the Behaviors of Users

Behavior records indicate that the majority of users join common activities, according to the provided schedules. However, there are some features which result from different ADL conditions: some IG elderly leave the day room or do their individual things, and some DG and HDG elderly sleep or wander when activities are being held. From a survey of behaviors, it can be seen that the ADL of elderly and activity schedule are important variables that impact on the behaviors of users at the two DSCs.

Most users of DSCs are frail elderly: except for IG participants who move by their own will, others have to use supplementary equipment or need personal aid when moving. This reason causes most elderly to behave in accordance with the activity schedule and to be passive in expressing their wishes. It should be noted that activities at DSCs should refer to the desires of elderly, change, and be balanced in terms of whether they are static or dynamic.

6.2 Variable Impacting on the Scale of Activities

Both DSCs are similar in that often in one common space all the participants carry out one kind of activity. Table 8. shows that at both the L-DSC and T-DSC, almost 80% of activities carried out are LG or MG, but seldom SG or PG. This indicates that the care pattern at both DSCs is a "collective care" pattern. This means that participants tend to stay a long time with the same people in the same setting.

Through appropriate measures to lessen the scale of the group, suitable furniture arrangements, and the aid of volunteers, L-DSC is able to enhance the frequency and pattern of interaction. From analyzing the results, it could be confirmed that the scale of activities was impacted on by three variables: (a) activity character which was decided by the activity schedule; (b) physical environment, including area and layout, equipment, and furniture arrangement; (c) care concept and manpower, such as when the activity is held to encourage personal interaction or using of the TV set as a substitute control, or to facilitate care by staff members or the assistance of volunteers.

6.3 Variables Impacting on Interaction Patterns

Interacting and socializing with others is an important part of daily living, especially for the elderly. The aim of the DSC is to facilitate social contact and communication among the participants. Comparing the survey results of the two DSCs, it appears that the physical environment is not the only factor impacting on the behaviors of participants at the DSC. The survey identifies one important thing: though the physical environment is not good enough, if the activities are diverse, and there is volunteer support, mixed-care DSCs have the potential to act as a critical interface for those with dementia to have community contact and to provide them with a positive social stimulus.

Regarding the behavior of participants at DSCs, the result of the interaction pattern is a complicated one, and is impacted on by at least three variables, namely, the participant's personal characteristics, the physical environment, and care concept of staff members. Our analysis found that these variables exist in a relationship as Fig.2. shows. That is, the users' behavioral characteristics, interaction pattern and activity scale are the outcomes of an interaction among the ADL level of elderly, conditions of the physical environment, and the care concept of staff members and manpower.

6.4 Planning and Design in Mixed-care DSCs

Regarding the service objectives in mixed-care DSCs, their planning and design should answer different requirements according to the ADL level of the elderly and whether they are disabled or suffer from dementia. The following are presented as suggestions:

(1) Shortening the distance between users’ spaces within the DSC when planning floor layouts.

Both L and T DSC were remodeled from existing buildings and functions. In the future, some DSCs may be provided by renovating current buildings, but there are some issues which should be taken into account when planning mixed-care DSCs. The distance from three activity spaces is too long at T-DSC; the naproom and stage which are underused occupy too much space in L-DSC, resulting in limited activity space in

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Fig.2. Variables Impact on the Interaction Pattern
the day room.

If space is sufficient and different rooms are available for activities of different scales, there would be a decrease in the movement time and the workload of staff members. If there is only one day room available for activities, then ample space should be ensured and underused space reduced or used in another flexible manner.

(2) Different activities held at the same time could be considered for the day room

The elderly spend a large proportion of their time in the day rooms of the DSC. According to the perspective of behavior-setting, the size and capacity, furniture arrangement and the atmosphere of the day room all contribute to how the elderly react in the DSC. It is important to consider a design that ensures ample activity space in the day room in order to meet the requirements of different ADL elderly and promote activities of different scales. Partitions can be used to divide the setting by furniture arrangements when required.

(3) The requirement of designing space to consider the need for wandering

One of the common problems identified in both DSCs was the lack of an appropriate space or path for the elderly with dementia to walk for rehabilitation or wandering. Elderly with dementia feel uneasy and move restlessly when in a closed space. Half of the participants in DSCs are cognitively challenged; hence, besides the space in the day room, it is also necessary to provide a path or route while taking into account open views connecting with the outdoors when designing a mixed-care DSC.

(4) Ample space in barrier-free corridors, passages and courtyards

The survey data shows that some elderly usually talk or take a walk as a form of rehabilitation in the corridor at T-DSC, and interact with others in the corridors, passages or courtyard in L-DSC too. Most of the elderly at DSCs depend on the environment to compensate for their physical or cognitive weaknesses. Besides directly taking part in activities, sometimes the elderly join the activities in indirect ways, for example, by just quietly watching and enjoying the atmosphere.

The above suggests that besides the formal spaces (day room, activity room, auditorium), informal spaces such as corridors, passages and courtyards should ensure that enough area is provided with some chairs for rest, and with barrier-free access, to provide and promote opportunities for participant interaction.

(5) Plural toilets with easy access are required

The interview results reveal that at both DSCs, staff members need to help participants with personal hygiene while carrying out activities or in their free time after lunch. But there is only one bathroom with a shower at L-DSC, causing females to make use of the male bathroom in some situations. And wheelchair users cannot access the toilet at T-DSC.

Proper consideration to locate the bathroom closer to the day room would improve and support the independence of participants and reduce the workload of care staff. The installation of plural toilets for males and females is required, and at least one UD toilet for wheelchair users should be provided.

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