



## “Good Fences Make Good Neighbors”: Territorial Dividers Increase User Satisfaction and Efficiency in Library Study Spaces



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### ARTICLE INFO

#### Article history:

Received 27 December 2014

Accepted 18 October 2015

Available online 11 November 2015

#### Keywords:

Academic libraries

Privacy

Territoriality

Table design

Survey

### ABSTRACT

We were consulted to respond to complaints from library users regarding the lack of workspace in a university library hall during busy periods. A behavior mapping study and a survey involving 78 students suggested that the tables in the library hall were used inefficiently, mainly due to a need for territorial markers. Accordingly, we proposed the design and use of new tables that provided dividers (among other improvements), and this design was implemented by the university administration. Follow-up research with 86 students indicated that the design improvements not only led to changes in seating preference trends toward more efficient use of the study hall, but also increased user satisfaction.

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University libraries are hubs of academic life, enriching students' educational experiences. They are important campus learning environments in which students work individually or collaboratively, interacting with each other as members of a learning community. Students visit libraries for a variety of reasons, ranging from checking out books and other forms of media to spending time in the physical space of the library studying individually or in groups. To accommodate these various activities, libraries' physical settings have an important role in effectively meeting patrons' needs and preferences. Accordingly, an important challenge in designing library settings is to provide design options that enhance user satisfaction while enabling efficient use of the available facilities. The research reported in the present paper was undertaken toward meeting that challenge at a university library. Specifically, the challenge involved providing solutions to complaints from library users regarding the lack of workspace in a library study hall during busy periods. Below, we first review some related studies and then provide an overview of the present studies.

### RELATED RESEARCH ON THE USE OF LIBRARY SPACES

Many studies have addressed spatial considerations in library design (e.g., library as place: Applegate, 2009; Bennett, 2003; Bennett et al., 2005; Demas & Scherer, 2002; Holder & Lange, 2014; Shill & Tonner, 2003), explored spatial needs to improve services (e.g., Acker & Miller, 2005; Fox & Stuart, 2009; Hunley & Schaller, 2009; Miller, 2008), and pondered the impact of physical space, its furniture, and equipment

on students' behavior and satisfaction when planning campus libraries (e.g., Bennett, 2006; Bennett, 2007; Campbell & Schlechter, 1979; Clee & Maguire, 1993; DeClercq & Cranz, 2014; Foster & Gibbons, 2007; Gayton, 2008; Potthoff, Weis, Montanelli, & Murbach, 2000; Rempel, Hussong-Christian, & Mellinger, 2011; Shill & Tonner, 2004; Webb, Schaller, & Hunley, 2008). Of particular relevance to the present problem are findings that seem to point to a library user's preference for studying in a library (thereby in the presence of others) but having a private study area. In that vein, some authors have concluded that academic libraries provide study spaces answering the needs of a community larger than that of universities alone because people who are not associated with the university also seem to use the library facilities for studying; hence suggesting that they seem to prefer studying with others who are also studying (e.g., Applegate, 2009; Bennett et al., 2005; Brown-Sica, 2012; Cunningham & Tabur, 2012; DeClercq & Cranz, 2014; Gayton, 2008; Montgomery, 2014; O'Connor, 2005; Schneekloth & Keable, 1991; Sommer, 1965; Stewart, 2010; Suarez, 2007; Webb et al., 2008). However, although users may want to study with others (even if they are not directly associated with them), they also seem to avoid being too close to each other when choosing tables to study at, as suggested by environment–behavior researchers examining human spatial behaviors such as privacy, territoriality, and personal space (see Gifford, 2002 for a review).

A broad theoretical discussion of the dynamics of such psychological tendencies is beyond the scope of the present paper. Therefore, in line with the current purposes, we simply conclude that this tendency may be likely to result in inefficient use of library spaces. For example, earlier studies involving seating preferences in academic libraries have suggested that students seem to prefer to sit by themselves at tables,

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even when the tables are large enough to accommodate others and multiple seats at the tables are available (e.g., Sommer, 1965). If all the tables had at least one student sitting at them, an arriving student would choose to sit diagonally in relation to the other student (Eastman & Harper, 1971; Gal, Benedict, & Supinski, 1986; Sommer, 1965). These findings were supported by more recent research which found that library users would choose not to sit at a table when its usage is close to 50% full (e.g., Applegate, 2009; DeClercq & Cranz, 2014; Foster & Gibbons, 2007; Xia, 2005).

Thus, users seem to have needs for both togetherness and separateness. As Cowan (2012) and Fournier, Lane, and Lyle (2010) have stated, students like to have others working with them, but want space to spread out materials. Carrels (personal study units with high partitions) may appear to satisfy both of those needs; however, findings involving carrels seem to be somewhat conflicting. For example, Gal et al. (1986) have found that students only sit next to others at a table when the tables have high partitions; otherwise they prefer to take only the diagonal seats. Other studies have suggested that students seem to prefer to sit at tables as opposed to carrels (Bennett et al., 2005; Eastman & Harper, 1971; Loder, 2000; Webb et al., 2008; Young, 2003; Xia, 2005), which were described by one student as “They box you in” (Bennett et al., 2005, p. 17). Still, in other studies, carrels and/or carrel areas have been found to be popular (Vaska, Chan, & Powelson, 2009), but less so when alternatives are provided (Applegate, 2009), and seem to be preferred under certain conditions, for example, being near a window, in a well-lit area or having low partitions (Applegate, 2009; Kilic & Hasirci, 2011; Loder, 2000; Shill & Tonner, 2004; Vaska et al., 2009; Young, 1993). Thus, we can conclude that rather than carrels, students in library study areas seem to prefer working at tables that provide visual privacy for their work but are in proximity to others. For example, the study furniture rated highest for quiet study by students in one study was a Y-shaped divided table (Holder & Lange, 2014); students drawing their ideal library group study areas in another study drew “...conference tables, and partitions or other structures to provide some level of privacy...” (Foster & Gibbons, 2007, p. 22). In line with our conclusion, Schneekloth and Keable (1991) have observed that students often use territorial markers on tables such as books, magazines, and backpacks. Overall, the above findings seem to suggest a preference to study together, but also a need for some boundaries.

Furthermore, in recent years, libraries' physical properties and spatial requirements have been changing with the emergence of new technologies, such as portable computers and electronic devices, which influence patron needs, preferences, and behavior (Brown, 2004; Cowan, 2012; Fournier et al., 2010; Mohanty, 2002). In fact, Bennett (2003) found that this change in student study space needs was the second highest reason for library renovations (after growth of the collections). For example, internet access and availability of alternative study spaces have had a great impact in changing study habits and use of library spaces, widely drawing students to study outside the library (Mohanty, 2002). A survey (Fournier et al., 2010) with 1894 students has shown that electrical outlets for laptops was the number one necessary feature cited by students in a study area, above comfortable furniture, quiet spaces, and large tables/surfaces. Brudvig et al. (2009) have found that students want wireless internet connectivity throughout a library. Thus, in recent years, students seem to need not only surfaces on which to place materials, but also electrical outlets through which to charge electronic devices (Brown-Sica, 2012; Foster & Gibbons, 2007; Halling & Carrigan, 2012; Holder & Lange, 2014; Montgomery, 2014; Norton, Butson, Tennant, & Botero, 2013; Vaska et al., 2009; Xia, 2005).

## OVERVIEW OF OUR STUDIES

As noted above, the present research was undertaken after the authors were consulted as members of an interior architecture department to respond to complaints from library users regarding a lack of workspace in a university library hall during busy periods. The present

paper reports the results of an exploratory study involving observations (behavior mapping) and two studies involving before–after assessments in a university library study hall. Our aim in the initial observations and in the first study was to analyze the problem of inefficient use of the tables in the hall and to generate possible design solutions to increase user satisfaction and the number of people using the tables.

Our initial behavior mapping and survey results suggested that the tables in the library hall were used inefficiently: four-person tables being used by only one student due mainly to a need for territoriality/privacy. Accordingly, we proposed the design and use of new tables that provided low dividers together with other improvements, and this design was implemented by the university administration.

Our aim in the second study, which was conducted after our design suggestions were implemented, was to obtain assessment measures from the users and make comparisons with the earlier measures, in line with the research suggesting data gathering before and after re-modeling library spaces (Campbell & Schlechter, 1979; Foster & Gibbons, 2007; Montgomery, 2014; Norton et al., 2013). Thus, the second study can be considered a field experiment, enabling us to compare the measures obtained after the changes with those obtained as part of the initial survey. Both parts of our research are explained in detail below.

## PILOT STUDY

### THE SETTING

The setting for the study was one of the major reading halls, with an area of 655 m<sup>2</sup>, at the main library of a large university in Ankara, Turkey. The hall is utilized as a quiet study area, as areas for louder group study are provided elsewhere in the library building. In the original configuration, the hall housed approximately 80 study tables (mostly for four students: 120 by 80 cm) with 280 chairs, as well as book stacks.

### EXPLORATORY OBSERVATIONS: BEHAVIOR MAPPING

Behavior mapping is a type of direct observation of behavior, which provides quantifiable information about the use of a space (May, 2011). In this method, people's locations, activities, and movements within a setting are tracked and noted systematically to understand behavior and how it relates to the physical setting; that is, their use of space. Behavior mapping helps record people's actual behaviors, as opposed to those that are only reported. Thus, combining behavior mapping with self-reporting, as we did in the present study, may help get a better picture of people's behaviors in a setting.

Accordingly, in the present study, in line with Ittelson, Proshansky, Rivlin, and Winkel's (1974) description, we identified observational categories and created keys for noting different behaviors. The study hall to be observed was divided into four equal areas, the plans of which were distributed to four groups of nine graduate students from the interior architecture department, who conducted the observations under the supervision of the authors. The students were responsible for preparing a schedule of observation that would cover high-density periods in the observed section of the library. Each student was asked to check his/her observations with those of his/her teammate(s) to obtain inter-observer reliability. The students observed their areas every 15 min for a period of 2 h during the times when the hall had the highest density. Using a predetermined checklist and coding system, they noted gender, location, activity (walking, sitting, conversing, reading, writing and/or working with a computer), and marked these observations on the plans.

Because the main purpose of this pilot study was to obtain a better understanding of the problem to be tackled in further studies, we were basically interested in the general trends suggested by those observations. Therefore, rather than providing detailed information here,

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