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Exploring Casual Tabletop Interactions

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1 INTRODUCTION

Although there are many different types of tabletop displays in the literature, there are very few fundamentals known about what tabletop interfaces should look like or should behave. In order to obtain a better understanding of these questions, it seemed appropriate to back up a little from the interface design, and look at tasks and environments that we would like to support. Thus, several observational studies of traditional tabletop collaboration were undertaken to inform the design of collaborative tabletop interfaces. To get a broad understanding of tabletop collaboration in a variety of settings and tasks, these studies involved both informal and formal collaboration. This chapter describes the informal collaboration study, which involved participants playing tabletop games in a drop-in setting, inspired by kiosks setup in many science museums.

The purpose of these studies was to gain a better understanding of how people use the space provided by a tabletop surface and how they use artefacts on a table during collaborative tabletop activities. This information can help to develop effective tabletop display technology to support face-to-face collaboration. There has been a variety of tabletop display systems developed in recent years (Durbin *et al.*, 1998; Rekimoto & Saitoh, 1999; Streitz *et al.*, 1999; Vernier *et al.*, 2002; Wellner, 1993), but there has been little investigation of the usability of these systems for collaborative activities. More importantly, most of the interaction styles used in these systems have evolved from interaction styles used in existing vertical displays systems, such as the typical desktop system running Windows, Mac, or Unix.

Two disadvantages of using these interaction styles to support collaboration on a tabletop display include: 1) the interaction styles have been optimized for use on a vertical display surface, and 2) they have been optimized for single-user interaction with the computer (most computer-supported collaboration occurs over a network, with each collaborator interacting with their own computer). Vertical-display interfaces have a fixed orientation of the display artefacts (e.g. windows, dialog boxes) that has an obvious "top" and "bottom." This does not allow easy viewing for multiple people who are seated at various sides of a tabletop display. Single-user interfaces usually have only one of each type of input device (e.g., one mouse, one keyboard). This does not allow concurrent interaction for multiple users, which collaboration researchers have shown occurs when people interact in non-technology environments (using pen and paper) (Tang, 1991) and in technology environments that provide support for multi-user, concurrent interaction (Scott *et al.*, 2000).

Understanding how people interact with artefacts and with the space on the table in a non-technology environment can help us develop tabletop display systems that support natural collaborative behaviour around a horizontal surface, instead of trying to evolve technology that has been optimized for other uses. The first study employed an ethnographic-style methodology, where hand-written observations were taken while people performed a variety of simple, non-technological, collaborative tabletop activities in a casual, drop-in activity area.

2 METHOD

This study involved an observational session conducted to explore the use of artefacts and table space during co-located collaborative tabletop activities in a casual setting. In this phase, the author observed participants interacting alone and with others at three activity kiosks. Each kiosk contained a different entertainment activity, which was chosen because of some potential it offered for collaboration. Due to the casual setup of this session, modelled after the type of drop-in tables one might find in a science museum, only one of the activities the kiosks required collaboration. The other activities could be done either alone or in a group. This task design was meant to encourage people arriving alone to also participate. Moreover, this task design also provided the potential for data to explore the differences between individual and collaborative use of artefacts and table space during tabletop activities.

2.1 Participants and Setting

On August 9, 2002, three activity kiosks and an observation table were setup in one corner of the atrium area on the lower level of Dalhousie University's Faculty of Computer Science, in Halifax, Nova Scotia, Canada (see Figure 1). Observations were taken during a five-hour period from 2:30pm-7:30pm. Over the course of the observational period, 18 people participated in the various activities. Some participated for several hours, while others participated for as little as 10 minutes. Most participants appeared to be students from the ages of 20-30, including males and females of varying ethnic origins.

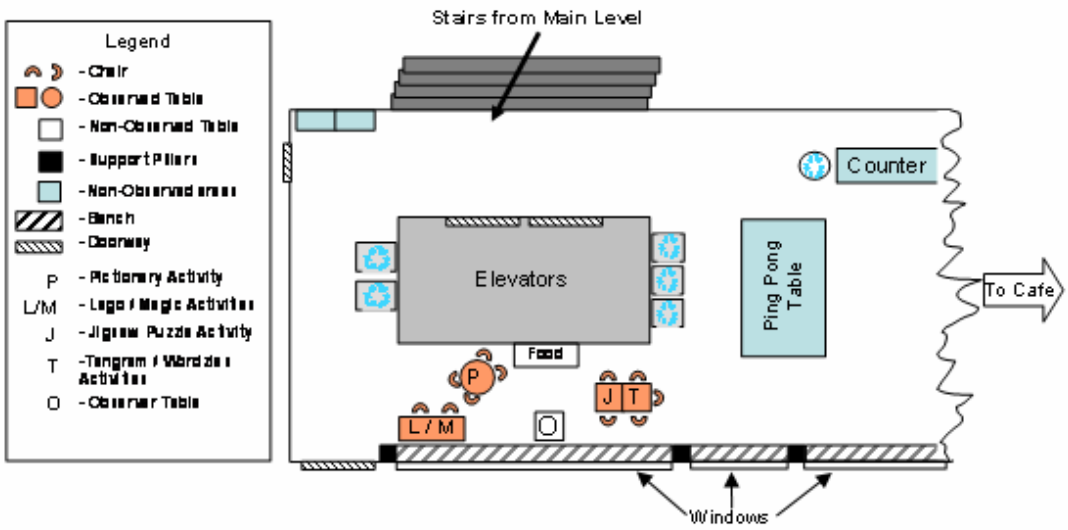


Figure 1. Experimental setup for Phase 1: Collaborative Tabletop Games

Due to the "drop-in" nature of the activities, an implied method of subject consent was used. Large signs were posted advising people that by partaking in any of the activities at the activity kiosks they were consenting to be observed by the researcher. These signs were placed on the walls behind each kiosk and entering and leaving the observational area. The signs included contact information for SFU's and Dalhousie's Research Ethics Boards in case anyone had complaints about the study. They also advised participants that an Information Sheet for Participants detailing the study was available at the researchers' observation table, which was also located in the observational area. Since consent was implied through participation, it was decided beforehand that no observations would be recorded of children in the area; however, this was not an issue as no children were present during the session.

2.2 Experimental Tasks: Tabletop Games

Given the "drop-in" nature of the study, the tabletop activities available at the kiosks were required to be fairly common, well-known activities familiar to participants, or having simple, obvious rules that could be explained easily by quick-reference instructions located at the kiosk. All activities had instruction sheets outlining their basic instructions. The activities ranged from activities that could be performed either alone or with others to activities that require multi-person participation. The three activity kiosks included:

- *The Puzzle Table* consisted of two adjoining square café tables, approximately 2.5x2.5 feet each. Five chairs were arranged around the tables (two on each long side and one the end furthest from the observation table). At the beginning of the observational session, a jigsaw puzzle (in its box), *Lost in a Jigsaw II*, was placed on one table and two other puzzle games, the Tangram and Wordles puzzles, were setup on the adjacent table. The Tangram puzzle is a traditional Chinese geometric puzzle. The object of this activity was to arrange a set of 7 shapes to form shapes depicted in the booklet of silhouettes provided. Wordles are word puzzles where the object is to guess the word or phrase represented by a word clue. Clues are composed of play on words and words arrangements, for example, the clue: "DICE DICE" yields the solution: "paradise" and the clue: "gges gegs sgge gesg" yields the solution: "scrambled eggs." A list of Wordles clues, solution sheets for participants to record their answers, and pens were provided.

- *The Pictionary® Table* consisted of one round table, approximately 3 feet in diameter. The Pictionary® board game was setup on the table, with four chairs around the table, arranged for two, two-person teams. The object of the Pictionary® game is for partner(s) on a team to identify a word or phrase through sketched clues drawn by alternating team members as many words as necessary to advance past a final game-board position. Sketches could not include letters, numbers or the # symbol. Activities in this game include: drawing on a sketchpad, guessing the word solutions from the sketch being drawn by your team member (or potentially from the other team's sketch during an "All Play" situation), rolling game dice, moving game pieces on the board, retrieving and returning clue cards from a clue-box, setting the sand-timer, passing the sketchpad.
- *The LEGO® Table* consisted of one rectangular table, approximately 2x5 feet. Two chairs were placed along one long side of the table and the other long side of the table was close enough to the bench along the wall to provide seating at the bench. Activity instructions were taped to each corner of the table and random Lego blocks were piled on the far end of the table, with extra pieces in an open plastic storage container in the bench beside the table. While participants were free to build whatever they wanted with the Lego® blocks, the activity instructions suggested the goal of re-designing the Faculty of Computer Science Building

2.3 Procedure

There was no set procedure for this phase of the study. Since the goal was to observe the natural interactions[1] of people during interesting tabletop activities, no specific behaviour was imposed on the participants. Participants were free to wander into the activity area, investigate the different activities on the tables, help others perform the activities, and chose activities they wished to play. Participants were free to perform the activities in any order and for as short or as long a time period as they desired.

2.4 Data Collection and Analysis

Field notes were recorded by the author from a variety of locations in the activity area. The majority of the observational data was taken from the observation table (see Figure 1), since it was positioned to give a clear view of the activities at the three kiosks. The observations focused on participants' use of artefacts (e.g., sliding, lifting, rotating, or holding of a game piece), and use of the tabletop surface (e.g., placing out-of-play game pieces on an empty spot on the table to the left of the game board). Field notes were also recorded of activity-related verbal or non-verbal communication between participants, any activity-related physical or verbal behaviour involving activity artefacts or the tabletop.

Observations were recorded of the activity at one kiosk at a time, depending on which kiosk currently had participants and the amount of different activities occurring at each. Most of the observations were recorded at the Puzzle Table since it attracted more participants than the other kiosks. Interactions of lone participants were observed, but the activity of participants playing together was favoured for observation.

Initial review of the field notes revealed a recurring pattern of tabletop interaction that occurred during game play. Whether interacting alone or in a group, participants partitioned the tabletop workspace into several areas, or territories. Participants used three types of territories: personal, group, and storage. To further explore the use of these territories, interactions in each of these territories was recorded. Then, for each territory type, these interactions were synthesized by creating an *Affinity Diagram* (Holtzblatt & Jones, 1995) to cluster related activities.

3 FINDINGS

Along with observing the games described above, an unexpected opportunity arose during the observation session to observe another tabletop activity. During the first few minutes of the session, a student approached the author to ask if he and his friends could play the card game Magic2 on one of the kiosk tables because they knew the study was about observing tabletop games. Although strictly competitive games were specifically avoided for the set of original study activities, the opportunity was seized because no other participants were currently in the observational area. They were instructed by the author to set up on the Lego® table since, from pilot study observations, the

[1] More specifically, behaviour that is as natural as possible while still gaining consent from participants to be observed.

[2] *Magic: The Gathering*® is a card game with game-specific cards and several game pieces.

Lego® activity was expected to be the least informative for artefact manipulation on the tabletop3. While primarily a card game played in the hand, a game of Magic™ also consists of cards played on the table and collection of game pieces (which look like small black and white stones). While competitive in nature, several interesting observations were made of their use of the table space and interaction with tabletop items.

Interactions and use of table space varied depending on the type of activities being performed and the artifacts that were used to perform the activity. For example, in the jigsaw puzzle task there were many puzzle pieces and the upper and lower lids for the puzzle box. Thus, there were two types of artifacts for this task: (1) many small pieces to be assembled to form the product, and (2) two box lids that were used in two different ways: (a) the box lid contained a sample puzzle key, which was referred to occasionally; and (b) turned upside down they formed convenient trays to store extra pieces. Likewise, the tangram task had two main types of artifacts: (1) a number of pieces to be assembled to form the product, and (2) the silhouette reference key. Contrarily, in the Pictionary™ task there were many different types of artifacts used in the task: (1) a board game that remained more or less stationary in the center of the table, (2) player markers for the board, (3) a sand timer, (4) a small box filled with clue cards, (5) various paper pads for drawing clues, (6) pencils, and (7) a pencil sharpener.

Overall, the participants' interactions with items on the different tables were fluid and dynamic. They were opportunistic in their use of the table space; they piled and stored items – at the edge of the tables, at arms reach on the table when working alone, in available holders, such as the puzzle box lids and on nearby chairs. People shared the space easily, fluidly expanding and contracting shared or personal spaces as the number of people at the table changed.

Some general tabletop practices that were observed during participants' tabletop game play are listed in Table 1. They provide further details about how people interact with task objects and the workspace when collaborating. Specifically, people frequently touch the table when referring to objects during conversation, people maintain distinct areas on the workspace for personal and group work and also for storage of currently unused items, and people sometimes use non-task-related items in the workspace during their interactions.

Table 1. General tabletop practices observed during tabletop game play.

Use of Gestures
1. Participants frequently used gestures, and would often touch items on the workspace while they referring to them, without moving the items.
Use of a Shared Workspace
2. Distinctive areas on the workspace emerged during the evolution of the task, including personal and group workspaces, and storage space.
3. Participants shared task materials in the workspace, but often kept their own "pile" of frequently used materials close to them.
4. Participants put non-task items on the workspace, e.g. beverages and food.
Collaborative Interactions
5. Participants frequently interacted with both hands in the workspace.
6. Participants frequently interacted concurrently in the workspace.
7. Different participants interacted with the same objects in quick succession, often handing off items to each other (e.g., pens, tans).
8. Group members transitioned between independent and tightly-coupled group work on the table.
9. Participants would sometimes temporarily disengage from the group activity to pursue a thought or activity individually.
10. Participants often would retrieve items for their partners both with and without solicitation.

During all tabletop games, participants' partitioned the tabletop surface as they were performing their activities. Three types of table spaces, or territories, were observed during the game play. The observations revealed that the use of personal, group, and storage territories on the various game tables. The boundaries between these territories appeared to be quite flexible. The territories were partially defined by their location on the table (e.g., personal territories generally existed directly in front of a person at the table), but where one territory ended and another

[3] The pilot study showed that much of the interesting object manipulation during construction of Lego® structures occurs off of the table – in participants' hands or above the table in 3D space. Although we decided to retain the Lego® activity, it was considered a low priority activity for observation because it was less applicable to the development of a 2D interface.

began was often determined by the location of items on the table and the activity that was currently being performed. Personal territories would often expand and contract, depending on whether a person was currently working in parallel to the other group members or in conjunction with the group. The following sections describe the three types of territories that were observed. The properties of each territory are discussed, along with examples form the field notes of interaction in each of these territories.

3.1 Personal Territories

A personal territory is an area on the table that a person uses to perform the main activity of an individual task or to temporarily disengage from group interaction to perform parallel activities during collaboration. In the various activities that were observed in this study the area directly in front of each person on the table, to within easy arms reach of that person was used as their personal territory. The group territory often overlapped this area when that person was engaged in activity with other members of the group.

The resulting categories of the Affinity Diagram for personal territories are shown in Table 1. As can be seen in this table, the personal territories were not only used by the person who "owned" the territory, but it was also an important resource for other group member who would often monitor what individuals were doing in their personal territories.

Table 1. Characteristics of personal territories resulting from the Affinity Diagramming process.

Personal Territories
Typical Activities
simultaneous multi-item translation and rotation
comparing items
assembling task product (e.g. puzzle, tan silhouette)
placing task items (e.g. cards in Magic)
searching of task items (e.g. puzzle pieces)
sorting (e.g. puzzle pieces)
people leaned on table in these spaces
Purpose(s)
working individually on same task as group is in group space (e.g. tans)
temporarily holds group resources, until person is done with them
Role in Collaboration
sometimes used as a reference area for others, for monitoring a collaborator's activities
help/assistance from someone else for a personal task (e.g., counting card in Magic)

One example of this collaborative use of a personal territory is shown in the Excerpt 1 from the field notes, which describes the situation illustrated in Figure 2. P_B uses his personal territory to figure out a solution on his own while the others work in the group territory. When he thinks he has the solution, he goes back to the group territory to try out the idea with the actual tans. The other group members refer to his drawing, which is located in his personal territory, to try to understand what salutation he is trying to implement.

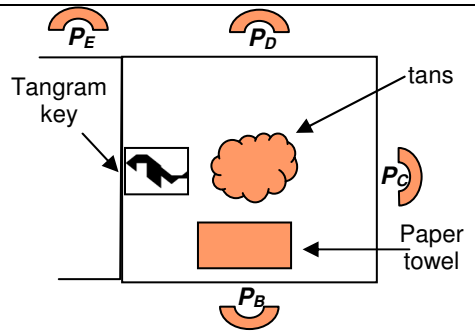


Figure 2. Players at Tangram table.

Excerpt 1.

P_E is watching P_C put tangram together [Tangram key is facing P_C]

P_B gets paper towel and pen and tries to draw the tans on a piece of paper towel to solve the current tangram.

[snip]

P_B is still drawing on the paper towel. He moves 2 small tans together in the middle of table, then returns to paper towel.

P_B says "Ok." He starts moving the tans around on the table. The other players are all looking at his paper.

P_D says "Now you need to get that inside."

P_E says "How many did you solve so far" [to the group]

Another example, from the Magic game, shows a player assisting another player in his personal territory. Excerpt 2 describes some of the interactions at the Magic table, illustrated in Figure 3. P_4 appeared to be the least skilled Magic player at the table. P_3 would often offer suggestions, instructions, and clarification of the rules to P_4, such as helping him count his game points in this example. P_4's cards were clearly in his personal territory, yet P_3, as the tutor role, appeared to be welcome to assist P_4 in this area.

Not surprisingly, the personal territory used during individual game play, such as in the jigsaw puzzle task, occupied a much larger area on the table than the personal territories observed in the group activities.

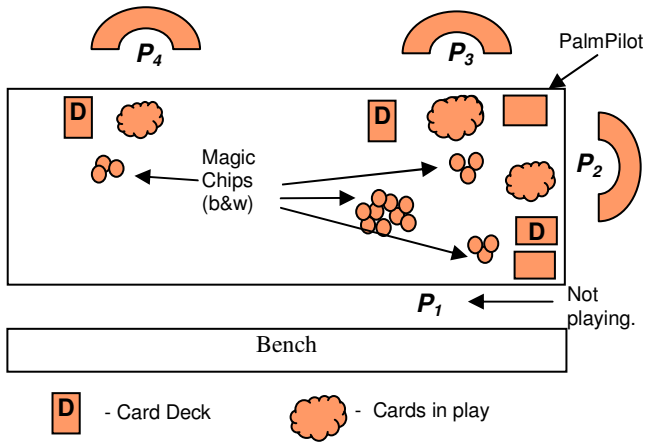


Figure 3. Player arrangement at the Magic card game table.

Excerpt 2.

P_1's going through the cards on the table in front of him…looking at the deck in hand and placing cards on the table and then picking them up.

P_2 slides game chips towards him when he wins a hand – keeping them on the table, he slides them one by one with his fingers.

P_1 has a card with 2 white chips sitting on top of it.

P_3 reaches over, touches all P_4's cards on the table while he counts out loud [points?]

P_4 rotates the cards on the table 90 degrees.

P_1 is being dealt into the game.

The tangram task was the task that attracted the most fluctuation of concurrent participants, varying from one to four concurrent players – even though there was only seven tans available for manipulation. Excerpt 3 and Figures 4 and 5 illustrate how fluidly the territories boundaries change, in location and size, when the number of participants increases and decreases at the table. Both the location and orientation of the task items (puzzle key and working tan silhouette) suggest and availability of the items. When P_D joins P_E at the table, P_E "invites" P_D's assistance by moving the task items away from his personal territory and into a more communal area on the table – one closer to P_D. When P_D leaves the table, P_E then reclaims the items by changing their location and orientation back towards himself.

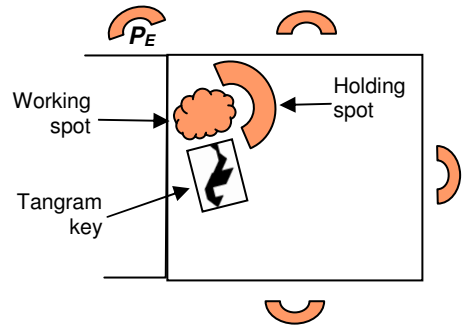


Figure 4. Initial player and item arrangement at the Tangram table.

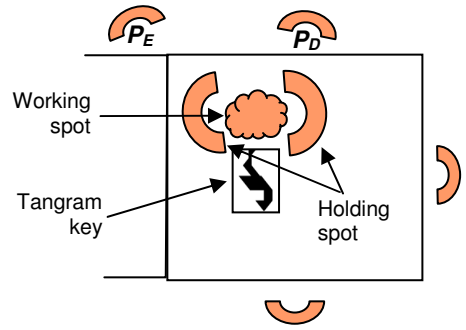


Figure 5. Player and item arrangement after P_D arrives at the Tangram table.

Excerpt 3

P_E is still working (alone) on the same tangram. There's a "working spot" and "holding spot" for the pieces.

Whenever he's trying a new combination of tan positions, he puts the pieces in the "working spot." When something doesn't work, he slides the pieces to the left or to the right of the working sport. When trying new tans into positions, he often holds the piece in his hand and turns it, or turns it on its "edge" against the table to "flip" the piece.

A new guy has joined P_E in position P_D to help with the tangram. P_E's explaining what he's doing. P_D's looking at the tans as P_E manipulates them on the table.

The tans are now more in front of P_D – P_E pushed them over and is working on them from the side.

[snip]

P_D's now moving tans around the table. He attempts to move the pieces again, but P_E is moving the pieces. P_D keeps his hands on the table near the "work area." P_D & P_E both have their hands besides the work area, within 1-2 inches to the left (P_D) and right (P_E). P_D is just "resting" his left hand and P_E is manipulating the tans.

[snip]

P_D gets a phone call and leaves the table.

P_E shifts the tans back towards him – just a bit. It's still on the other table and he's still in the same seat. He tilts the orientation of the working area towards him a bit.

3.2 Group Territories

A group territory is an area on the table used by collaborator to perform their main task activities, such as creating a group product. Subgroup territories can also emerge between subgroups at the table. In the activities that were observed in this study, there was typically one group territory that was located in the central area of the table and adjacent areas between the individuals seated at the table.

The resulting categories of the Affinity Diagram for group territories are shown in Table 2. This table shows the group territories were used for both performing task activities as well as assisting others in performing these activities.

Table 2. Characteristics of group territories resulting from the Affinity Diagramming process.

Group Territories	
Typical Activities	
	assembling task product (e.g., tangram)
	displaying group-related information (e.g., game board in Pictionary™)
	sorting
	assistance from other group members (e.g., tangram, Pictionary™ timer)
Purpose(s)	
	working on group product by several members of the group
	working on group product by an individual, while others in group discuss the problem (e.g., tangram)
	placement of reference items for individual work when task is offloaded to Personal Territory to try new ideas (e.g., tangram)
Properties	
	generally located in a central area on the table, easily accessible by all members (but not all members can easily reach all of the group territory, but typically everyone can reach most of the space)
	existence of sub-group territories when there are sub-groups working at the table (e.g., Pictionary™ and at the puzzle table, there were different groups working on different things at once – jigsaw, tangram, and word puzzles)

An example of group assistance is shown in Excerpt 4 from the tangram task, illustrated in Figure 6. In this situation, P_D is trying to assist P_B & P_C as they are assembling the tan silhouette in the group territory.

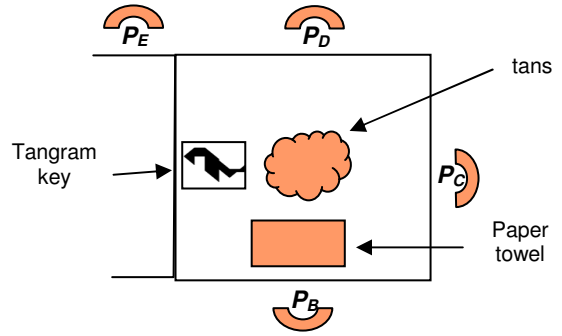


Figure 6. Player arrangement at the Tangram table.

Excerpt 4.

On the table edge, they switch the tangram key to a new silhouette.

In the middle of the table, P_B and P_C are both arranging tans. P_D is pointing and suggesting moves but not placing.

P_D – "What about the small triangle?"

Another example, from the Pictionary™ task, is shown in Excerpt 5, illustrated in Figure 7. In this excerpt one player assists another player from the opposing team by moving the clue card box out of her way when she turns over the timer. In this example, P_H assists P_J without any explicit request assistance from P_J; P_H spontaneously offered his help in making her task (of turning over the timer) easier.

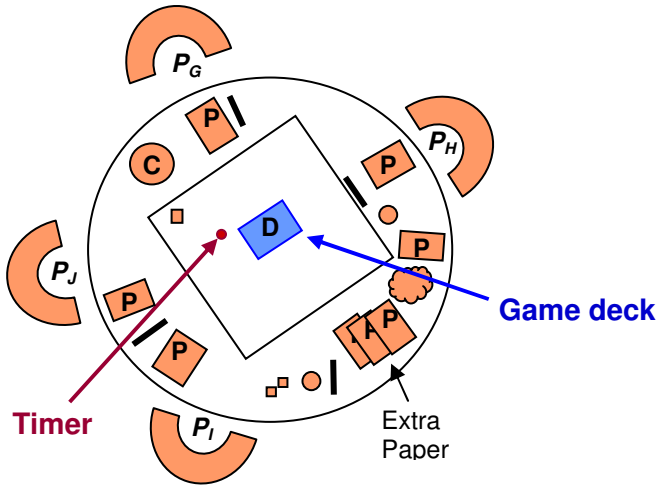


Figure 7. Player arrangement at the Tangram table.

Excerpt 5.

P_H pulls the deck towards him a bit when P_J turns over the timer, moving the deck out of her way.

3.3 Storage Territories

Storage territories were maintained near the table edge outside of these other two territories, within reach of the collaborators.

- Areas on table on the periphery of personal and group territories, often along the table edge.
- Used to hold reference items, tools, items not currently in use, and non-task items (e.g. food). Often temporary and/or mobile.

A storage territory is an area on the table that people use to store items that are not currently being used. The participants placed various items in storage areas on the table, such as reference items (e.g., tangram key, puzzle box lid), tools (e.g., pencils, pads of paper), spare task items (e.g., tans not currently being used), and non-task items (e.g., beverages, candy). During game playing storage territories typically emerged on the periphery of the personal and group territories on the tables. Storage territories were often located along the edge of the tables. Furthermore, the storage territories were sometimes temporary and mobile. Participants were quite opportunistic in their creation

of storage territories; they would use spare table space along the table edges, nearby empty chair seats, jigsaw box lids, their laps, and the floor.

The resulting categorizations from the Affinity Diagram for storage territories are shown in Table 3. One observation, which is revealed in this table, is the extensive use of piling in the storage territories. Items were often piled, searched through, and loosely rearranged in the storage territories.

Table 3. Characteristics of storage territories resulting from the Affinity Diagramming process.

Storage Territories	
Typical Activities	
	searching, when brought closer (e.g. puzzle)
	piling
	storing items
Purpose(s)	
	placement of non-task items (e.g. bowls, cups, etc.)
	placement of reference items (e.g. puzzle key in tangram, box lids in jigsaw puzzle)
Properties	
	multiple storage areas
	moveable storage areas (e.g. puzzle box lid)
	full & partial storage areas – some appear to be more "temporary" than others
	can be piled (e.g. jigsaw puzzle box lids)
Boundary Actions	
	reference of one person to items in storage territory beside someone else (e.g. Magic)
	movement of items in "bunches" to personal territory (e.g. a group of puzzle pieces were piled/spread out for use)
	fluid transition of items between storage and working territories, personal and group

Items in the storage territories were very loosely arranged; there was very little effort made to keep the storage areas strictly organized. Items were typically kept in partial orders in the storage territories. For example, in the jigsaw puzzle task participants created separate piles in the storage territories to group various classes of puzzle pieces. Figure 8 illustrates an instance of the jigsaw puzzle table during the assembly of the puzzle. The box lids contained loose, mostly non-edge puzzle pieces. A pile to the right of the working area (i.e., personal territory) contained the four corner pieces, randomly arranged. Several individual edge pieces and some assembled edge pieces whose final location had not yet been identified were loosely placed along the left table edge. Finally, edge pieces currently being considered were scattered in the middle of the assembled edge pieces.

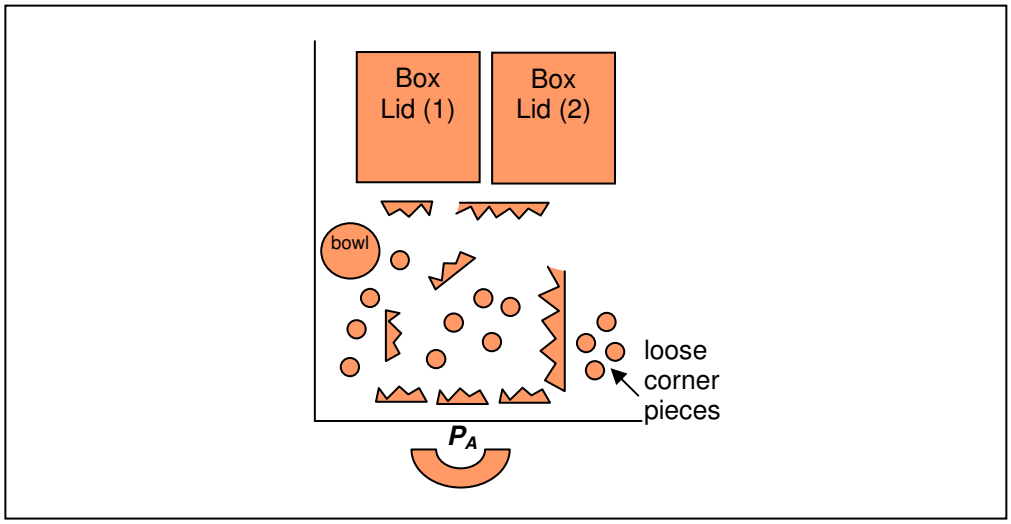


Figure 8. Jigsaw puzzle task during assembly.

The study data also reveals that participants took advantage of the ability to move storage territories, when possible. Excerpt 6 from the jigsaw puzzle task, shown in Figure 9, illustrates several examples of a participant exploiting the mobility of the box lids, which he was using to store extra puzzle pieces. He would remove edge pieces from the box lids, work with them in his personal territory until he had exhausted his attempts to match these pieces, and then he would search for more pieces in the box lids. Being able to bring the lids closer to him facilitated the search process because he could more easily see and reach the loose pieces. He fluidly transitioned between search in the box lids, pulling out interesting pieces, and replacing the box lids back to their peripheral location.

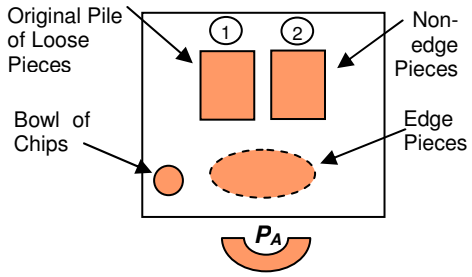


Figure 9. Early state of the Jigsaw puzzle task

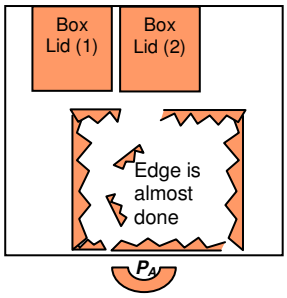


Figure 10. Later state of the Jigsaw puzzle task, when edge is almost fully assembled.

Excerpt 6.

P_A moves the box lids closer to him – box lid (2) is about 3 inches from edge of the table. As he's digging through the top lid to find all of the edge pieces he's sliding the box lid towards him – it's not a separate action – he's dragging the edge with his wrist as he's digging in the box. P_A leans over the box to look inside.

Once he finishes pulling edge pieces out he pushes both lids to the center again – he still has non-edge pieces in both lids.

[snip]

P_A's scanning edge pieces – picks up box on the right – pushing through the pieces, replaces and does some with box lid on left.

P_A replaces the lid without removing any pieces.

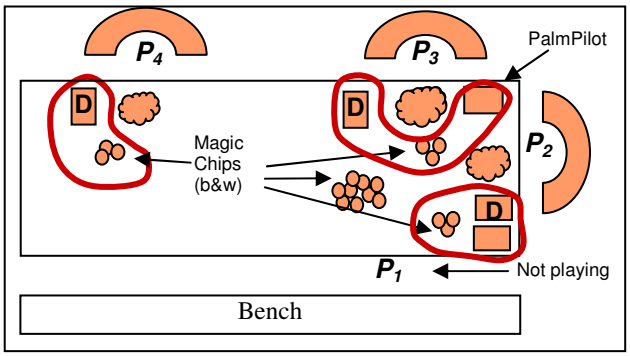
[snip]

P_A's sliding the pieces around inside the finished edges.

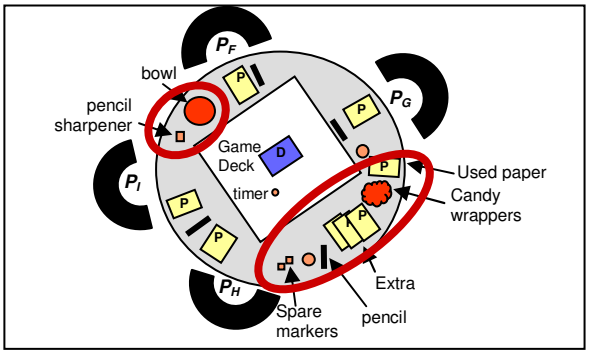
P_A's finishing off the edges – He's rooting in the box again looking for missing edge pieces [he said this].

P_A found a piece that connects to an edge piece – he connects it on the table. He's holding the box lid in his left hand, leaning back in his chair, rooting through the pieces with his right hand. He sets the box lid back on the table and sighs.

When several people are interacting at a table multiple storage territories usually emerged, as show in Figures 11(a) and 11(b). It is currently unclear whether there is a distinction between "personal storage" and "group storage" territories. This may depend with who "owns" the items being stored in the storage territories. In this study, most items on the tables were provided by the experimenter, so in a sense they were "public" items for the collaborators. One exception was in the Magic™ task, in which participants brought their own artifacts, such as game card decks and game chips. Furthermore, unlike a typical card game where everyone would play with cards from a common deck, each Magic™ player brought their own deck of Magic™ cards to use. It appeared that each person stored their decks and the chips they earned during game play near their own personal territories. Players would sometimes refer to items in a storage territory near another player.



(a)



(b)

Figure 11. Storage territories in (a) the Magic™ game and (b) the Pictionary™ game are indicated (in red).

Excerpt 7 (and Figure 12) illustrates one such example of a player referring to how another player has arranged cards in the storage territory near him. On the other hand, a "general" storage territory that emerged along an unused table edge in the Pictionary™ game, as shown in Figure 11(b). Many factors may have contributed to these observed differences, such as nature of the game or the type of game artifacts that were used. More investigation into this issue would be required to clarify whether there are various "kinds" of storage territories.

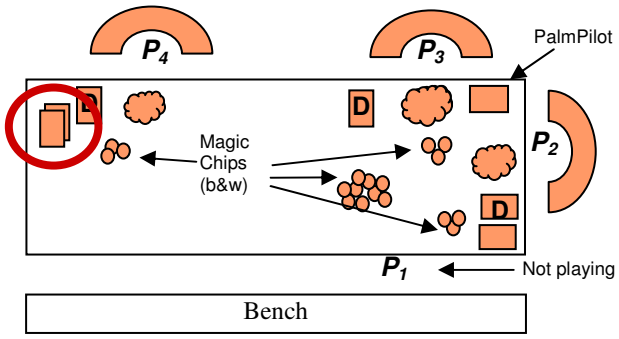


Figure 12. Another storage territory in the Magic™ game is circled.

Excerpt 7.

P_4 puts 2 cards that were face up on the table in front of him on top of the cards to the right of his deck.

P_3 – "You have to put your graveyard face up"

P_4 flips over the cards he just placed to the right of his deck.

4 CONCLUSIONS

We have presented a study and findings from an observational study of casual tabletop interaction with traditional media. This study has highlighted several interesting tabletop interaction practices. Specifically, we observed the use of personal, group, and storage territories. These tabletop territories appeared to help people organize and perform their tabletop activities, akin to *territories* in our broader environment (e.g., a roommate's "side of the room"), which help to mediate our social interactions (Altman 19975, Taylor 1988). In order to further explore collaborators' use of the tabletop workspace, and the role that these tabletop territories play in the collaborative process, we will be following up the study presented in this paper with a more in-depth observational study.

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