'Table Manners': Children's Use of Mobile Technologies in Family-friendly Restaurants

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Abstract

This paper presents findings from a small ethnographic study of children's use of technology in family-friendly restaurants during dinnertime. We explore children's use of a range of devices (iPad, mobile phone, laptop, etc.) in terms of the layout of the table, the juxtaposition of artefacts, the timing of interaction around eating, and the management of behavior or 'table manners'. Ultimately we argue that mobile technology use is adeptly managed by a range of actors – children, parents, and restaurant staff – to facilitate a positive dining experience. Further we find that mobile technology use provides unforeseen opportunities for learning, game playing, and intergenerational interaction while allowing families to spend time together. Finally, we outline design considerations for restaurants and designers to better support children's mobile technologies use in family-friendly restaurants.

Author Keywords

Mobile technology; intergenerational play; children; family mealtimes; restaurants; table-top interaction.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Ethical Considerations

The research was approved as a standard project from the University's Human Research Ethics Committee. All participants have given permission for the photographs to be published, all names mentioned in the paper are pseudonyms.

We sought permission from the restaurant owners/managers to video record beforehand. A protocol was developed and agreed upon in case other patrons questioned or were disturbed by the presence of the camera. Each family received 50 AUD as a contribution towards the cost of their meal. We recognize that familial behavior in these recordings may not be natural, as families were aware of the video-recording.

Introduction

There is an old saying "*the family which eats together, stays together*". Mealtimes in the family are a site for the exchange of personal and collective narratives [21, 24]. These exchanges are considered important for the social construction of shared knowledge, dependency, accountability, storytelling, everyday planning, socializing children, and other social, political, material, and cultural aspects in the family [10]. However, for families with two working parents, increased scheduled after-school activities, and often longer commutes, formal family mealtimes at home are becoming less frequent. Conversely, family dinners outside the home are on the increase [12].

Mobile technology usage by children during mealtimes is generally problematized as negatively impacting on familial interaction, reducing satiation, or simply 'bad manners' [18, 22]. Despite this, it is now commonplace to see children using technology at mealtimes, both at homes [6] or when out to dinner in family-friendly restaurants [30]. However, there is little research which examines these interactions to understand what it is that children are doing with the technology, how technology is balanced alongside eating a meal, and how these activities are mediated and managed by others to ensure a positive dining experience.

This case study builds on our early work which examines everyday use of technologies at the dinner table in familial homes [6, 7]. We extend these by focusing on the semi-public space of restaurants and considering the role of different family members, other patrons in the restaurant, and staff members to manage technology usage and its implications. We begin with examining the related works in this area.

Related Works

Literature examining technology use at family mealtimes often views it as problematic; focusing on links between television watching and health concerns [2], or viewing technology as impeding social interactions [11]. More recently, work within Human Computer Interaction (HCI) space has focused on how technology supports social interactions during mealtimes [8, 9, 23]. While research explores adult's experiences, there is little focus on children's technology usage [1]. Further, restaurants are spaces in which families may have to carefully manage the social norms of eating in public, the behavior of children, and ensuring that children eat sufficiently and well [19]. The use of technology in these communal spaces may therefore be particularly challenging.

Children's Use of Technology in Restaurants
While recent works focused on examining technology use at family mealtimes in domestic settings [5-7, 18, 22], there is little research that examines such usage outside the domestic context. This is surprising given that children's use of mobile technology use in public settings is increasingly common (e.g., [16, 20, 26]) and that current estimates of children's use of technology in restaurants is around 34% [30]. One notable exception is the study of parental use of technology in fast food restaurants by Radesky et al. [27]. They found that children tended to misbehave when parents were distracted or focused on using their technology at the table. Notably, this study did not address children's use of their own technology and its impacts on activities and behavior. This is a worthwhile area of study, because restaurants are both semi-public but constrained spaces in which individual people have to interact and engage with other people with an

Participating Families and children's technology use

Family 1: Australian Pizza Restaurant.

The father did not bring any technology at the restaurant, while the mother and another family friend (woman) brought their smartphones. This family has two girls (14 and 11 yo.), who used a smartphone and an iPad mini respectively. The other mother brought her child too (11 yo), who used an iPad mini. The three children's technology usage included making avatars, social networking, playing games and making a music video.

Family 2: Italian restaurant.

Both parents attended the meal. Their children, all girls, aged 14, 12 and 9 years, brought a laptop, and 2 iPad minis, respectively. The children from the host family constructed a love letter, did their homework, and played games (e.g., Tiny Towers, Subway Surfers). (continued)

awareness of strangers seated nearby, restaurant staff within earshot and members of the public walking past.

There are concerns about children's use of technology in restaurants within the public sphere. These include that technology is used as 'digital babysitting', used to ensure children behave while adults eat, and that it is detrimental to children's health. Also, technology use is seen as simply 'bad manners' and that 'using tablets installs bad habits when it comes to dining etiquette' as there is less 'fork on the left' talk. In contrast, traditional tools, such as coloring books, used to occupy children in restaurants are not viewed as alienating children from familial conversation [34]. Indeed, one parenting site advises parents on ways such as this, in which they can successfully occupy their children in restaurants without using technology [25]. In contrast, organizations such as the Family Hospitality Group (http://familyhospitality.com/) are designing technology for use in family restaurants to 'help you keep kids busy and parents happy, so families can relax, stay longer, visit more often, and spend more money at your restaurant'.

Common Technology Usage in Restaurants
Restaurants are becoming aware that the provision and use of technology can encourage people to use the restaurant, stay longer (thereby, potentially ordering and eating more) and post updates and reviews about their experience on Facebook, Instagram, TripAdvisor, etc. This is a marketing tool, for example, the Wireless Social group [33] encourages other businesses to draw in and retain a customer base, partially through the provision of free Wi-Fi access. This is a strategy specifically used for the restaurants and other spaces that families frequent [33]. In return, the business

captures their data usage while at the restaurant to target customers more appropriately in the future.

The use of technology in family-friendly restaurants is becoming more common. While some restaurants offer large televisions for customer viewing, others routinely offer free Wi-Fi, and some even have experimented with offering games for children e.g., McDonalds in Singapore (https://goo.gl/qu8uhu), Chili's restaurants in the US, etc. Further, some restaurants encourage patrons, including children, to order their meals through iPads or other electronic devices placed on the table (e.g., Red Dragon restaurant, Melbourne, Australia), thereby reducing staff labor.

HCI: Technology Usage at Family Mealtimes
Traditionally, HCI has focused on the functional aspects of family mealtimes and offered 'solution' to different food related problems (e.g., [14, 17, 29]). Grimes and Harper [15], to the contrary, proposed a focus on the positive experience of our interaction with and around food. Since then, many efforts have focused on designing technologies for this space, including but not limited to remote dining experiences [32], digitally augmenting food [13, 31], media as a conversational resource at mealtimes [8, 23], and experimental technologies designed for restaurants [28]. We focus on children's technology usage at the semi-public settings of restaurants, in which children are constrained to a small area (the table). Here, children's behavior can impact on others, specifically other diners. This is similar and yet different to other work.

Methodology
We took a qualitative approach, primarily using two in-depth semi-structured group interviews with all the

This family were caring for two additional children for some months. A girl aged 12, and a boy aged 10. During this meal the boy used an iPad mini to play Minecraft, as did his sister.

Family 3: Chinese Restaurant.

Both parents brought their mobile phones and both of their boys (aged 12 and 7 yo) used iPad minis to play games and watching videos, respectively.

Family 4: Pizza Restaurant.

Consists of two mothers from separate families (the fathers were travelling). The first mother brought 3 children, girls aged 14 and 12 years and a boy aged 9. The eldest girl brought her iPhone, the middle girl an iPod, the boy an iPad mini. A family friend with her daughter aged 12 years came to the meal and brought her iPad mini. The girls played games, including Pet Rescue, Snowflake, Candy Crush, and updating social media (Facebook and Instagram).

family members, home tours, and self-recorded video observations to capture and understand familial use of mobile technologies at dinnertime in family friendly restaurants. We recruited a small number (n=4) of families through extended social networks of the authors, and personal Facebook sites. We specifically targeted families that eat their meals together in family-friendly restaurants and commonly allow their children to use mobile technologies (e.g. mobile phone, iPad, iPod, etc.) when out to dinner. The purpose of this work was not to capture generalizable data which represented practices across a population, rather we sought to present four detailed but unique ethnographic accounts [4] of the ways in which families negotiate, use and manage technology when out to dinner.

The first interview was conducted prior to their meal out and sought to capture the nature of the family's mealtime experience and to identify which technologies are allowed during mealtimes (if any), and any differences between practices at home and when out to dinner. Each participant, including individual children, were encouraged to show the researcher which technologies they used generally, for what purposes, and to discuss how they are used. Each family member was encouraged to recount and share experiences.

We then gave the families a video camera and asked them to video record one evening meal taking place at a local family-friendly restaurant they have used before. They were asked to mount the video camera on a small tripod at the end of the table and angle it downwards to capture interaction with technology taking place above, on top of or below the table. The families turned the camera on when they were seated, and off just before leaving. Therefore, all aspects of the

meal e.g., choosing items from the menu, waiting, ordering, eating, and finishing, were captured.

The interview and video data was transcribed, reviewed, and analyzed by the researchers using an inductive, thematic analysis [3]. In particular we were interested in how mobile technologies were introduced, interacted with and managed by all participants during the course of the meal. The management of technology included a range of aspects including the physical placement of the technology when in use and not used, conversation around technology use and eating, and discussion of the role of technology and social expectations around behavior or 'table manners'. A final interview was conducted with each family to further answer any questions arising from the video data.

Findings
We focused on the minutiae of interaction from this data, including which technology was used, for which purpose, who used it, what the material arrangements of technologies and people were at the table, and the role the technology played in terms of the interaction of family members, other patrons and staff members.

Setting up the Table and Introduction of Technology
In all the video recordings, we notice how the children sought permission before bringing devices onto the tabletop and asked if they are allowed to play with devices. The parents in family 1 and 4 spent a period of time supporting the device set up to configure their own mobile devices as hotspot so that their children can access the parent's data. The Internet data was used for a variety of purposes, e.g., searching, social media, game playing, etc. The children in the other families did not have access to an internet connection.
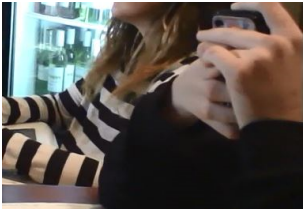
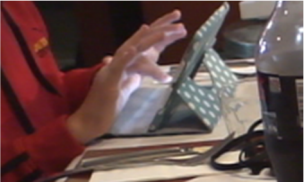Figure 1: Child holding mobile phone up to face.

Figure 2: Two handed interaction on iPad.

Figure 3: Using iPad to 'show and tell' about puppies.

The children had an assortment of devices (iPads, laptops, iPods, mobile phones, etc.). No-one brought a handheld gaming device, despite having these at home. Every child had a mobile device for use, one child who forgot her device, borrowed another's (she had multiple devices) for the evening (family 2). This created issues later when she amended the layout of the loaners house in her 'Minecraft world' without permission - *"I have put a couch in your study and I put a sign at the top saying this is where you study too hard and you need a nap"*. The older child replied *"thanks but don't put anything else in there"*. Privately she reported that she did not like the changes but she would invite her friend to play in her world anyway.

Children generally placed their device on the tabletop in front of them, thus everyone could see what they were doing. iPads are placed either flat down on the table, or standing up in their stands. Only one older child (girl, aged 13) held her mobile phone up close to her face so others cannot see it (Fig. 1). She later explains she had created an avatar she did not want her family to see.

Some exceptions to this included instances where the devices are placed on their laps when the table was full and they are waiting for their own meal. Drinks etc. are placed peripherally to technology. Large items (e.g., jug of juice) are carefully placed in the center of table. Parents warned children to keep their devices away from drinks or food - *"careful Robbie"* (family 2).

Interaction with the Technology
Interaction with the technology happened at different parts of the table and outside of it. Children used their devices on the table, below the table, above the table,

on nearby tables (family 4) and even outside of the restaurant (e.g., in family 1, discussed later).

In most cases, the children interacted with the devices with either one hand or both hands, and some of participants alternating between using pen and using hands to interact with screen (especially in family 2 where two girls were doing their homework). One exception to this was the youngest child in family 3 who ate with his hands while also using the screen. He would eat a chip for example, then wipe his hand on his jumper, touch the screen, then eat again.

Technology Usage and Timing of the Meal
Children started using their devices after the family was seated at the restaurant and did not put away their devices until the main meal arrived. Drinks were served first and were placed peripherally to technology. Dips, appetizers, etc. were placed in the center of table. Only when large meals/plates arrived did the children place the technology away to a more convenient location - in bags below the table (family 1), on their laps (family 3), or on the seats next to them (family 2 and 4).

The arrival of the first course of meal signaled time for the technology to be placed away collectively (as a group). There were only two instances where this did not happen. The first was when one child in family 2 took a little longer than the others to put away her technology, the reason she gave for this was that she was saving her game. The parents viewed this as a sufficient reason for the delay and did not reprimand the child. In another instance, the youngest child in family 3 had to be told by the father to put his device away a number of times (he was watching a video and wearing large earphones). We found that the parents
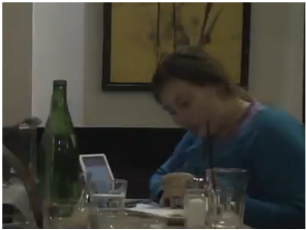
Figure 4: Child using iPad app to write a letter in Italian.

Figure 5: Girls watching video on iPad together.

Figure 6: An older child tells his younger brother to put technology away.

generally did not need to prompt their children to put away technology, but if someone was slow in putting it away, then others (e.g., older sibling in family 2) might remind them (Fig. 6). Once a child finished his/her meal then s/he could start playing on his/her device again. The technology is put away collectively when the meal begins, it reappears individually when its respective owner finishes eating.

The Purpose of Technology Usage at Restaurants:
PLAYING GAMES
A wide range of pre-existing games are played by our participants (e.g., Minecraft, Crossy Road, etc.). Some of these games are online (e.g., the ones played by children in family 1 and 4) – in this instance the children shared the same 'world' (e.g., Minecraft) - but most of the games played are offline, as Internet was not available for families 2 and 3. In these cases, the children logged in to their existing saved games or began new episodes of their games. We also noticed how children swapped and shared devices so other siblings could try and beat their score at their game (e.g., family 1), or experience a new game. These outcomes were often shared with everyone at the table.

SOCIAL NETWORKING
Older children used mobile phones, for social networking opportunities (e.g. Instagram). The children in Family 3 and youngest child of family 4 were not allowed to use social networking due to the age of the children. While some of this interaction is deemed to be personal or private (Fig. 1), much of this kind of usage was shared amongst the family - e.g., family 1 shared photos of family pets amongst the group (Fig. 3) and read out text message from a friend, family 2 read out a text message from an absent grandparent, etc.

Families 1, 3 and 4 said that it was common for them, when and where they had internet available, to take photos of their meal and upload to Facebook (adults) or Instagram (children) to share with others (we can see this in both video and interview data). This is particularly common practice for families (e.g., family 1), when travelling overseas. They reported that they would purposefully seek out restaurants which had free Wi-Fi so the children could share their meals and experiences with family and friends at home.

WATCHING VIDEOS
Another frequent use of mobile devices at restaurants was to watch videos. For example, the children in family 3 watched animated videos with the headphones on (Fig. 6), the children in family 1 watched YouTube, and family 2 had downloaded pre-existing videos into their mobile devices for watching at the restaurant. However, this interaction generally took place towards the latter part of the meal (family 1, 2, and 4).

LEARNING
Learning was not only found within the interaction, it was sometimes the purpose of the interaction. For example, the oldest daughter in family 2 downloaded an app to learn Italian. She used this to write a love letter to her boyfriend in Italian, often seeking support from her mother (e.g., "*mum how do I say I love you in Italian?*"). This was not a school exercise, rather it was something she wanted to learn in her own time. Another child (also family 2) brought her school laptop with her and used it for most of the meal to complete her homework, even though it was a birthday celebration for her. The parents of these children reported that it was commonplace for their children to complete their homework while out to dinner.
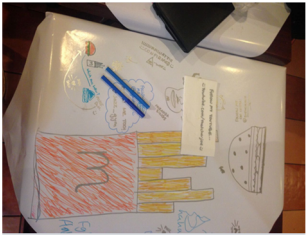
Figure 7: Children in family 4 used crayons and paper.

Figure 8: Children sitting at table playing with tech, with their drawings next to them.

CREATING VIDEOS

The children in family 1 used their iPads to create music videos using the 'VideoStar' app in the park next door, after their meal, while their parents remained in the restaurant. This afforded them extra space, privacy, and ensured they did not bother fellow diners. The parents were comfortable with this, as the restaurant and park were frequented often and were close to their home. The two mothers physically left the restaurant to check on the children periodically. Family 2 said that they have a rule that their children are not allowed to sing at the table in restaurants as they are 'too noisy' and 'can't sing', although the children said they have used VideoStar inside restaurants on other occasions.

MIXED MEDIA

We found that the children played with mobile devices alongside traditional tools if offered, for example, family 4 used all available tools, e.g., iPad minis, iPod, parent's mobile phones, and crayons and paper (the latter provided by the restaurant). The children further combined the technology and other media together seamlessly e.g. when drawing on paper table cloths provided by the restaurant, take photos of these drawings and writing 'follow me' by inserting their Instagram address into the images. In addition, children incorporated more traditional games into their play. For example, family 4 played a version of hide and seek, by leaving hidden messages underneath napkins of the next table. It is worth noting that the parents and restaurant staff seemed amused, and did not object, perhaps because it occurred at the end of the evening when no more diners were expected. Finally, we recognize both the observed and potential negative aspects of technology use in restaurants. These include that children with large headphones on are less likely to hear and engage with others, that competitive play and shared device use could lead to arguments and increased noise levels thereby disturbing other diners, and that technology use can be problematic in small spaces. We recognize that all actors; children, parents, staff and diners nearby had to actively work to ensure a positive dining experience which included children's use of mobile devices.

Discussion and Design Ideas

Firstly, children adroitly manage technology use around other activities, including choosing, ordering, eating, and engaging with their parents. They often move between multiple screens (e.g., iPad, iPhone, or laptop) seamlessly, but they are also seemingly aware of the context of the interaction, being careful to avoid other artefacts on the table such as dishes, drinks, cutlery, etc. Children continue to talk and converse even though they might be on different technologies, different worlds, or realms within the games on technology.

Second, children comfortably borrow and lend each other's devices. We did not see any evidence of arguments amongst the children, despite competition about who could gain higher scores on shared games. Third, we saw many examples of intergenerational play, e.g., family one 'show and tell' photos of their new puppies, these were selected by both adults and children, and shown to the whole table. Technology was also instrumental in linking people at the dinner table with others not present (e.g., grandparent in family 2).

Fourth, parents continue to 'check in' on kids, asking what they are playing on technology, and asking to see various screens. In addition, parents regularly checked that children have eaten 'enough' – technology is

managed in the context of this (e.g., "*can't play with iPad until finished your meal*"). This was seen across all families, and particularly with younger or fussy eaters.

Fifth, all members of the family actively sought to manage behavior around the table. Older children self-regulate, and manage younger siblings, e.g., by repeating parents' instructions, telling them to put away a device, etc. For example, one older sibling had to pull the earphones away from the younger child's ear in order to repeat parent instructions to put away the technology (Fig. 6). It was apparent that families were conscious of fellow diners, e.g., parents often tell children to 'quiet down' as other diners are nearby. Finally, the restaurant staff have to manage the placement of food and drinks in relation to technology, and space at the table - we saw one example of a waitress playing 'tug of war' with the menu as the child had her iPad on top of it and was engrossed in play.

Suggestions for Designers
Firstly, we encourage designers to design technology which supports learning about restaurant etiquette e.g. which utensils to use (and when), speaking softly, how to order a meal, when to engage with restaurant staff and so on. **Secondly**, we encourage designers to design games which might facilitate intergenerational playful interaction in the restaurant space. These might include games which can extend the playful ways in which families can use technology to order their own meals, e.g., using games which count calories or encourage healthy ordering, or encourage understanding of food journeys from 'paddock to plate'. **Thirdly**, technology design which adapts to the type of restaurant and its cuisine would also be welcomed, e.g., so children may learn about Mexican cultures and

traditions if eating in a Mexican restaurant, or learning Italian words if eating in Italian restaurant.

Suggestions for Restaurants
Family-friendly restaurants could consider providing free Wi-Fi, spaces for children to play with technology alongside traditional play items such as crayons, and hold all's for technology while family is eating (e.g., pockets sewn on the walls or attached to the side of tables, or a shelf above the table to place additional mobile devices). Further incentives might include opportunities to charge technology while at rest, and for families to document positive dining experiences.

Conclusion
We call for flexibility in understanding the role of technology use in restaurants. Children's use of technology is not merely 'digital babysitting', rather it serves a number of purposes including educating children about etiquettes, improving educational outcomes, playing games, and including absent family and friends. Also, technology use is adroitly managed by all participants to ensure a positive dining experience. Similar to other dining times, parents are concerned that children eat well and that they have 'table manners' when in the presence of others. While technology has to be carefully facilitated in this space, we have seen it can be used as an opportunity for socializing children into expected behavior in public spaces, facilitate learning, provide opportunities for intergenerational play, and a place in which different generations can spend quality time together.

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