

INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT) AND EFFECTS ON 'TOGETHERNESS' IN FAMILY HOUSEHOLDS

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Family homes are equipped with multiple television sets, personal computers, digital music players, mobile telephones, fax machines, DVD players and electronic game consoles — the home is now a communication hub, enabling family members to perform numerous activities in a variety of times and spaces. As such, families are dealing with the cumulative effects of household technologies, and the interactions and ongoing negotiations associated with these technologies. This paper examines the research on media use and the associated family dynamics and behaviours in an Australian context. Australian family households are media and technology rich, with most families having three or more televisions, three or more mobile phones, a personal computer and Internet connection, as reported by the Australian Communications and Media Authority (ACMA 2007). This report also identifies that family households are more connected than households in general — nine out of ten families have an Internet connection, of which seventy-five percent have a broadband service. Given the ubiquity of information and communication technologies (ICTs) in the family household, it is understandable that communication in interpersonal relationships is increasingly mediated by the use of technology (Cameron & Webster 2005; Herring 2004; Kim et al. 2007; Soukup 2000; Spears & Lea 1994; Walther 1996).

Numerous (literally hundreds, if not thousands) of studies investigate media use and its impact on children, teenagers and the family (Anderson, B et al. 2007; Bures 2009; Harper et al. 2003; Livingstone, S 2009a; Roseneil & Budgeon 2004). Given the evolving quality of media and technology, and the changing nature of adoptions and adaptations of technology in the family environment, it is undoubtedly a field that warrants further research. It is not possible to review all of the available research literature; consequently I will limit the review to the issues pertaining to the dynamic relationship between ICT and families' use (of technology) that facilitates shared activities (family togetherness). It is important to highlight the *dynamic* nature of this relationship, as it is not uni-directional — the adoption and use of ICT affects, and is affected by the family that uses it. Given the vast amount of literature documenting the penetration and usage patterns of ICT in the home, there is little agreement about how ICT impacts on family time and relationships. We are moving towards developing a deeper understanding of how and why people use ICT, and the various contexts, dynamics and physical and symbolic functions of ICT (behaviour affects and is affected by the use of ICT) — beyond the realm of work and education practices, and into relational and family contexts. This review contributes to further our understanding, and to identify the gaps that require further investigation.

Effects of information and communication technologies (ICT) on families

Currently there are conflicting views regarding the influence of ICTs on family relationships, children, teenagers and individuals in general. On the positive side it is argued that ICTs, and more specifically computers and the Internet, can foster greater communication, improve access to education, promote global understanding and make the world a better place to live. Social relationships are also said to be enhanced due to a freedom from time and place constraints; and that time spent online may improve family relationships, due to providing an alternative modality for communication between family members (Gross 2004; Katz & Aspden 1997; Kraut et al. 2002; Livingstone, S 2003; Sook-Jung & Young-Gil 2007; Subrahmanyam et al. 2001; Van Rompaey, V, Roe & Struys 2002). Media's role is typically construed as negative, for instance, it has been

proposed that there is the potential for developing impoverished relationships and isolation of family members, because time spent with ICTs displaces time spent with family and friends (Kayany & Yelsma 2000; Nie & Hillygus 2002; Vandewater, Bickham & Lee 2006). Moreover, it has also been found that online relationships can weaken strong ties; reduce social involvement, family communication and face-to-face contact (Kayany & Yelsma 2000; Kraut, R et al. 1998). Recent research has reported that electronic media has a negative impact on children's mental and somatic wellbeing (Kappos 2007). Other focuses of concern have been on electronic media's potential to do harm, especially with regard to violent content and its impact on children (Anderson, DR & Hanson 2009); on individuals' psychological and social wellbeing (Carpentier et al. 2008; Greenwood 2008); and on general health due to the sedentary nature of technology use (Gorely, Marshall & Biddle 2004), for instance, television viewing is regarded as a principal leisure activity in the family home, and as such, it has been linked with obesity (Dietz 1996).¹

Research in the field of ICTs and the impact on family members will continue to provide conflicting results, perpetuating the division between utopian and dystopian ideals, as it has done since the introduction of the telegraph. ICTs facilitate computer-mediated communication (CMC),² helping families coordinate activities and develop information networks. Research on CMC has been criticised for its emphasis on the technical attributes of the technology and their effect on communication processes and outcomes; and also for being mostly individualistic and technologically deterministic. However, it is being claimed that 'everything is mediated' — that we are increasingly reliant on ICTs mediating almost every dimension of social and family life (Livingstone, S 2009b).³ Furthermore, much of the research literature tends to look at ICTs in isolation, rather than in concert — for instance, the positive or negative impacts of the Internet (Hughes & Hans 2004; Lee & Chae 2007; Mesch 2006b; Morahan-Martin & Schumacher 2003; Valkenburg & Soeters 2001), the home computer (Downes, T 2002; Facer et al. 2001; Ono & Tsai 2008; Orleans & Laney 2000; Subrahmanyam et al. 2001), and television (Boyns & Stephenson 2003; Brody, Stoneman & Sanders 1980; Eggermont 2006; Jackson, Brown & Pardun 2008; Krccmar 1996; Spigel 1992). It is evident that there is no consensus on whether the influence of ICTs is positive, negative or mixed. The conflicting research outcomes could be due to the focus on single technologies within the family context. As such, a shift is required in the research process from investigating one technology at a time with regard to individual members, to considering a family of overlapping technologies in the context of everyday use that captures family interactions.

Households and the domestication of ICTs

It is important to identify the defining terms in the study of ICTs in the family milieu. What is meant by the term information and communication technologies? ICTs refer to a wide range of 'modern' technologies, products and services that include (but are not limited to) the telephone (fixed lines), mobile phones, computers, televisions, and a variety of applications the Internet supports, especially email, and the World Wide Web. ICTs permeate Australian family homes, and as such are becoming embedded in peoples' everyday lives. The concept of domestication evolved from anthropology, consumption and media studies to consider the circumstances in which ICTs were experienced (Haddon 2006). The term is analogous with the domestication of animals — inferring the 'taming' of technologies to aid human activities. The technology is at first unfamiliar and unknown, exciting and threatening, but over time, and with experience, experimentation and increased accessibility, technology becomes a 'domesticated animal' and part of the everyday experience. It becomes familiar, less exotic and mundane; but also develops and changes, leading to

¹ For an excellent critique of media effects research issues, refer to Livingstone (2007a).

² CMC is defined broadly as interactive, text-based communication modes, and person to person communication via the internet.

³ See Livingstone (2009b) for an insightful discussion on mediation issues and the relationships between institutions, society, family and media.

innovations in the technology, and in the social and domestic settings where it is embedded (Anderson, B 2002; Davis et al. 2008; Silverstone 1993).

The last two decades have seen a shift away from the deterministic paradigm in the approach to investigating ICTs, to incorporate the social and cultural significance within the family household (Livingstone, S 1992; Morley & Silverstone 1990; Silverstone & Haddon 1996; Silverstone & Hirsch 1992). Morley & Silverstone (1990) viewed television as one of a number of information and communication technology devices that occupy domestic time and space. The authors wanted to recontextualise the study of television in to a broader ICT framework in the early 1990's, by recognising that television was not the only source of broadcasting programming, but 'the potential pivot of a video/entertainment/computer facility for the home' (Morley & Silverstone 1990, p. 31). While this is more than realised almost twenty years on, Morley & Silverstone contend that the television set may continue to remain the 'family hearth' in the home, albeit a multi-functional one. New media is seen to be integrated in with the old, but new and changing technologies and the distribution of hardware has profound implications on family and domestic life. Silverstone and his colleagues put forward a contextualist and interactionist perspective on how people make sense of, give meaning to and carry out functions through the material objects produced and offered by the market — this consumption is open to negotiation of the moral economy of the household (Silverstone, Hirsch & Morley 1992). 'The material context of daily life, the objects that constitute the household equipment, the spaces where they are located and the times when they are used are relevant dimensions that affect and are affected by family interactions, social organization and cultural references' (Caron & Caronia 2001, p. 39). This material context is becoming more complex, and this complexity requires new understandings on the way families make sense of their ICT infiltrated domestic world.

Researching the cumulative impact of technology on families

We are living in an era where families are dealing with the cumulative effects of household technologies (and the interactions and negotiations associated with these technologies). Livingstone (2009b) proposes that firstly, the media mediate, 'entering into and shaping the mundane but ubiquitous relations among individuals and between individuals and society', and secondly '*as a result*, the media mediate, for better or for worse, more than ever before' (p7). The multi-purpose capabilities of technology are changing the manner in which families operate. ICTs are being utilised for education, information gathering, entertainment and recreation, communication, personal development, home management and home business activities. Thus, technology provides families' with alternative resources to fulfill existing family functions and needs. Furthermore, as borders between technologies continue to vanish in terms of the functions and uses people make of them, boundaries blur between technology as a work tool and a leisure item, and between the public and private spheres. This weakening of boundaries has been associated with reduced family time as work enters the private sphere of the family (Shumate & Fulk 2004; Turow 2001). This highlights the question of the impact of ICTs on family's internal relationships, and on how families mediate with the outside world. In research conducted by Mesch (2006b) and Caron & Caronia (2001), it was found that parents regard the multiplication of technology in the home with a fear that their private sphere will be invaded. The authors interpreted this loss of control of domestic technology as meaning a fear of losing family cohesion. Van Rompaey, Veerle & Abeele (2006) address this issue by investigating how family cohesion is an indicator of ICT use and attitudes towards it.

Family cohesion refers to the pattern of separateness and connectedness of the family members. In connected families the individual members have very open boundaries towards other family members. In separate families family members have strong and rigid boundaries between themselves and the other family members. (Van Rompaey, Veerle & Abeele 2006, p. 1)

Given the nature of ICTs as purveyors of access to the external world, and that ICTs are firmly embedded in family life, how do families' manage their boundaries? Whether families are identified

as belonging to ‘open’ (there is more to life than just the family, the boundary is flexible between family members and the outside world) or ‘closed’ (family members are strongly focused on each other, and the boundary is rigid between themselves and the outside world). The manner in which family members use ICTs reveals something of the borders they desire to maintain between the inside (private) and outside (public) worlds. In determining the internal boundaries and how families manage them in relation to ICT, it provides greater insight into the nuances and complexities of the socio-technological world families operate in. By recognising the differing psychosocial structures of family, it will aid in advancing knowledge to better understand perceptions of ICT impacts within the family (Lanigan 2009; Meszaros 2004). We do not know very much about the strategies families’ engage to maintain or enhance family cohesion, and therefore manage boundaries.

With the increasing presence of domesticated ICT in households and the notion of home as an electronic communication hub, what happens to family members within these ICT infiltrated households? Do they spend more or less time with each other? Is more time being spent on the Internet at the expense of other media related activities, and in an individualised way? Does technology strengthen or weaken relationships among family members? As previously demonstrated, the research literature is divided on these issues. There is considerable research that emphasises the idea that ICTs (especially the Internet and mobile phones) facilitate social and familial connectedness (Christensen, TH 2009; Kennedy et al. 2008; Licoppe, C. 2004). Alternatively, there are studies that report ICTs hinder the potential for family connectedness, foster greater individualisation, and link high Internet use with weaker social ties (Kayany & Yelsma 2000; Nie & Hillygus 2002; Sanders et al. 2000). In an observational study conducted by Orleans & Laney (2000) investigating computers and family relationships, it was found that children between the ages of 8 and 17 years seldom communicated with their parents while using the computer, and often used the computer independently. Kraut, Mukhopadhyay et al (1998) found that parents and adolescents used the Internet more often to interact with non-household members; and family members were found to spend less time communicating with each other, than they did prior to gaining Internet access — which lends support to the notion that Internet technology damages family relationships. However, in a follow-up study these initial declines in family communication did not persist (Kraut et al. 2002).

A rapidly changing ‘communication technoscape’ will undoubtedly shape patterns of construction of social and familial relationships.

A relationship is usually conducted over a variety of mediated interactions and that, to understand how a given relationship might be shaped by communication technologies, one needs to take into account the way the management of a given relationship will rely on the whole available technoscape. (Licoppe, C. 2004, p. 135).

Licoppe & Smoreda (2005) claim that the traditional model of communication is being replaced by a new configuration of ‘connected presence’ where small gestures are as important as the message content. This pattern of communication must be viewed from the many available modes of communication technologies that enable it. Moreover, the ‘mediatization’ in everyday life is being recognised and new frameworks for analysis are being offered:

First, the media extend the natural limits of human communication capacities; second, the media substitute social activities and social institutions; third, media amalgamate with various non-media activities in social life; and fourth, the actors and organizations of all sectors of society accommodate to the media logic. (Schulz 2004, p. 98)

With each new introduction of technology into the home, there is the possibility of changes to family life. Van Rompaey, Veerle & Roe (2001) investigated how the arrival of a new technology medium stimulated a rearrangement of the domestic space and time. Temporal and spatial shifts occur in family activities such as meals, homework, or television viewing, in addition to changes in the physical configurations of the shared and private spaces, and leisure and work spaces in the

home (Livingstone, S 2002, 2007b). When a computer is first acquired, it has no obvious location, and will be found in a variety of 'stations' within the family home. Also, it will be moved around the home (usually in the more 'public' spaces for monitoring purposes) in an effort to 'domesticate' the machine and meet family needs for computer regulation. As media multiplies and proliferates within private locations of the household, family members are 'living together separately' and avoiding conflicts regarding media viewing choices (Haddon 2004; Livingstone, S 2007b; Schroeder 2006). The transformation of children's bedrooms into 'multimedia islands where children go to evade family life and as such create a physical compartmentalization between themselves and their parents' (Van Rompaey, Veerle & Roe 2001, p. 364) is an indication of individualised behaviour. However, despite ICT devices' infiltration of private spaces, there is some evidence that families do congregate in the communal viewing area (typically the living room) of the house to share media experiences (Holloway, D 2004; Livingstone, S 2002). With all of these contradictory forces at work, 'the home is often conceptualised as a place of sharing and solidarity where 'communitarian practices' are realised (Tutt 2008, p. 2335). The privatisation and personalisation of media has long been associated with the contradiction of post-modern home life: individuated and communal practices.

Media technologies are seen to be embedded within households and multiplying. This cumulative ownership of ICTs in households is recognised as a valid phenomena (at least in middle-class family households) and needs to be further investigated as a synergy of technologies impacting on family dynamics and activities.

Managing the technologies in the family context

Crucial to our understanding of ICTs in the family context is the ways in which parents manage or regulate the use of technology in the household. We are still in the early stages of understanding parental regulation of children's and teenager's use of Internet and other media technology — as a family boundary issue, in terms of dangerous situations and inappropriate content, and in terms of the ongoing interactions and negotiations associated with ICT use. Livingstone (2002) found that in a broader context of things to worry about, only a small percentage of parents (6%) were concerned about their children's use of ICT, and more focused on illegal drugs (51%), crime (39%) and education standards (38%). However, half of the parents in Livingstone's study claimed to have rules about their children's use of ICT, or Internet specifically, while the children reported half as many restrictions as their parents. We can only speculate as to why this inconsistency presents itself, but it is clear that more research needs to be undertaken to improve our understanding.

The results of longitudinal studies are beginning to emerge and acknowledge the reality that 'domestic spaces and familial times are increasingly characterized by connectivity and the use of information, communication and media technologies, which have quietly attached themselves to everyday domestic practices' (Nansen et al. 2009, p. 182). In the last decade issues about regulation and control over ICT use has seen a shift from parents being initially anxious about children's use of new media technology, to a more relaxed approach over time. As new media is appropriated in the home, it impacts on family life — materially, in the identification of a family need for the new technology; decisions about the purchase, where to place the technology in the home; and symbolically, via the rules and practices of who uses it, and how and when to use it. Controlling and regulating the new technology in the early stages of possession provides a level of governance over the technology (Caron & Caronia 2001). Cautious and restrictive use is practiced, until, over time, the technology is incorporated into the moral economy of the household and the social organisation of the family:

Submitted to an existing and enduring model of 'how things have to be, for what reasons', it lends itself to a local reinterpretation, to a make sense process that is thoroughly shaped by the specific culture and social structure of the family. Parallel to this process of assimilation into pre-existing family habits, norms and values, the discourse reveals the creation of new and often unexpected dynamics. (Caron & Caronia 2001, p. 46)

Appropriated technologies have a life cycle that changes across temporal and spatial dimensions. Usage patterns of ICT objects change over time, influencing family habits, and, as the technology becomes familiar, it leads to a 'cascading adoption of technologies' (ibid). As equipment becomes updated, the old television moves to a child's bedroom, the original desktop computer is replaced with a wireless laptop and moved into another location. This migration of technology produces changes in family activities and redefines the family spaces. As ICT diffuses and multiplies throughout the home, families set boundaries that maintain the status quo of their private world, and we know little about the strategies and activities that families employ to ensure family members ongoing interactions.

ICT and impact on family life stage

Concomitantly as ICT adoption and diffusion progresses through a life cycle, the family also moves through life cycle stages. This has implications for the management and regulation of media technologies, because each developmental stage the family experiences will require different approaches, depending on specific family needs and values. Watt & White (1999) investigated the impact of computer technology on the family and purported that the family had been treated as a homogenous unit in the research literature. The authors developed a typology of discrete family stages to address this issue, thus acknowledging that 'families go through a developmental process which involves significant change and adaptation on the part of the family at each stage of development' (ibid p1). They identified seven descriptive family development stages: mate selection, early marriages, families with preschool children, families with elementary school children, families with adolescents, post-parenting families and retirement families. These stages are not necessarily sequential or chronological, and families can return to previous stages. Given the various stages, it can be argued that: ICT activities that are found to be positively associated with connecting family members at one stage in the family life cycle, could become negatively associated in another stage. For example, the issue of family cohesion may be positively associated in families with primary school aged children, where parents and children collaborate and play together using ICTs such as the computer. However, families with adolescents may experience less family cohesion as developmentally, adolescents individuate from parents and pursue more autonomous and independent ICT activities.

Watt & White (1999) apply their family development typology to the use of computers in the family home, and claim the introduction of technological innovations into the family social system is seen as a catalyst of social change, which impacts on the nature of the internal family relationships. Mesch (2006a, 2006b) applied this developmental approach and investigated computer use at the family stage of parents with adolescents, focusing on relationship issues concerning parental authority and adolescent autonomy. Mesch found that the frequency of adolescent use of the Internet was associated with a decline in family cohesion; and this impacted family time spent together, and increased family conflicts. This confirms previous research that claims time spent together as a family is necessary for good relations between family members, and a reduction in such time is harmful to family cohesion (Subrahmanyam et al. 2001). Mesch (2006a) argues that parents and adolescents need to negotiate new rules around computer use as a way of managing the technology in the household — this is especially pertinent in the period of adolescent development. Tutt (2008) investigates teenagers' negotiations regarding interactions in the living room using video ethnography. He identifies that the 'construction of household 'rules', which are negotiable rather than determinist in practice, reflects different family views about how time should be spent in relation to media' (p2335). Where there is competition for media access (be it the computer, telephone, or television), families need to develop specific rules and strategies to control the duration and frequency of use of the media involved.

Family time together and life cycle stage

Psychological theory offers a number of theses about developmental changes in adolescents' family relationships. Traditionally it is viewed as a time of growing disengagement from family, and increased emotional autonomy on the road to becoming an independent adult. Psychoanalytic theory describes adolescents as driven to individuate from their parents (Livingstone, S & Bovill 2003; Notten & Kraaykamp 2009). A number of authors have added that concurrent with disengagement, a transformation in adolescents' relationships with their parents occurs, maintaining connectedness and continuity. Larson et al (1996) investigated issues of disengagement and transformation via daily interactions to determine how often, and under what circumstances teenagers engage with their families. Given that interactions are the place where relationships are enacted, by investigating family exchanges, we can determine whether relationships are maintained, enhanced or harmed. The amount of time, context and content of family interactions is related to age changes of adolescents, and that there is both disengagement and transformation in daily interactions.

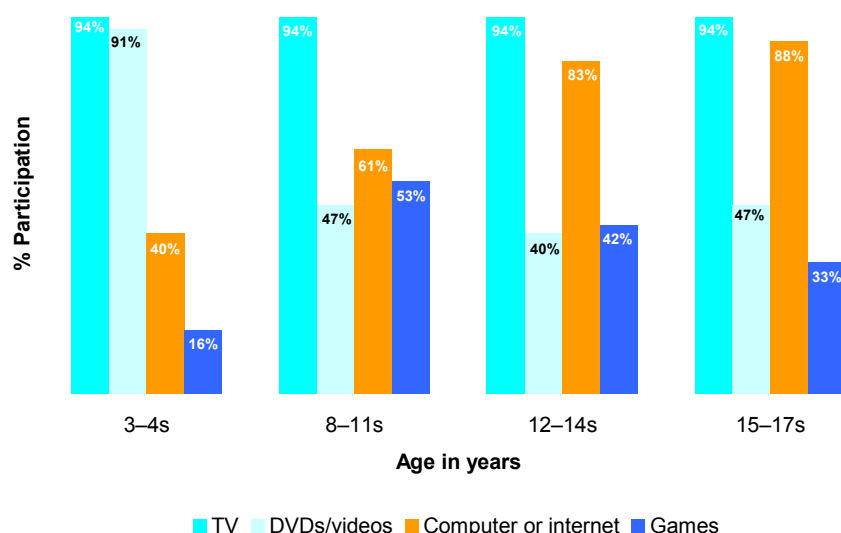
ICT use by adolescents in family households could be viewed as a way of achieving independence from parents, providing access to a world outside of the family. Larson et al's (1996) findings help inform the level and type of family activity: the most frequent time for family interaction across all age groups was Sunday evening after 6.00pm, whereas Friday and Saturday nights showed the largest declines in activity as teenagers got older. Leisure pursuits with family such as TV viewing (an activity involving less communication) and active leisure also showed the biggest declines as teenagers progressed in age, whereas time spent talking did not decline. There is also a general trend identified where television as a shared family media activity is in decline (Kennedy et al. 2008; Livingstone, S 2009a). This is partly due to an increasing variety of channels creating greater fragmentation of the audience, and the choice of other ICT recreational pursuits may offer alternatives to television viewing, such as home theatre nights, or DVD viewing.

A number of mediators of changes in family time have been identified: puberty, family conflict and other qualities of family relationships, as well as external factors (opportunities outside the home), and life situational factors (having a private bedroom; a phone and TV in one's room). Livingstone (2009a) asserts that there is an evident shift from shared toward privatised viewing in the last four decades, and that the shift is more apparent for teenagers than for ten to eleven year olds. Larson et al (1996) found that although overall family time declined, certain categories of family time did not; suggesting that withdrawal from family was discriminate. What are the discriminating factors?

Media and leisure activities — how families spend their time

How much time do families spend on media activities together, and as individual family members? The following figure provides Australian data on the amount of time young people spend with electronic media on a daily basis.

Figure 1: Participation and average time spent on electronic media per day (hrs:mins) by young people, 2007



Source: ACMA Use of electronic media and communications: Early childhood to teenage years (2009) p.1

The amount of time spent participating in media activities evidently increases as children enter and move through their teens. These results suggest that teenagers (12 to 17 years) spend just over 5 hours per day involved with electronic media (although this excludes mobile telephone use), and television viewing remains the main activity for 8–17 year olds. These findings reflect results from studies in the UK and USA (Livingstone, S & Bovill 2003; Roberts, Foehr & Rideout 2005). While this research is useful and informative, it neglects to provide answers regarding the amount of time spent using electronic media together as a family activity.

What ICTs do Australian households use?

With regard to ICT penetration, families with children under 15 years of age or dependent students are almost four times more likely to have Internet access at home than other family structures (ABS 2008). The Australian Media and Communication Authority (ACMA) have published a number of reports providing insight into the usage patterns and electronic media penetration of Australian households. It was reported that a great majority (90%) of family households are media rich, that is, they possess a number of electronic media and communication devices — 91% of families with 8–17 year olds have the Internet, 99% have television, and 97% have mobile phones and DVD players (ACMA 2008). Moreover, socio-economic and demographic characteristics, such as household income, parent education, couples or single parents, and location were no real barriers to access to electronic media. However, families with higher incomes enable them to have access to additional technologies in their homes such as subscription television, portable music players (MP3 & MP4's), digital television and multiples of computers, laptops and mobile phones.

ICT 'affordances' in the family setting

The computer has been identified as providing affordances as both a 'toy' and a 'tool' (Downes 2002), offering opportunities for multi-tasking in various settings. A report conducted by Roberts, Foehr & Rideout (2005) claims that modern teenagers fit more activities into their available leisure time by 'multi-tasking.' In Australia, it has been found that approximately seven hours per day is available to spend on discretionary activities (media and non-media), almost three of those hours is spent doing activities simultaneously. Furthermore, older teenagers (15–17 years) manage to squeeze twelve hours' of activities into their seven hours of discretionary time (ACMA 2007). Some

activities are more prone to multi-tasking than others — key among them is the use of mobile phones. Twenty per cent of time spent on mobiles is also spent watching television or DVDs, and 10 per cent is spent also listening to the radio. Ten per cent of Internet time is also spent watching television or DVDs, and the same proportion is spent listening to music or the radio (*ibid*).

Couclelis (2004) introduced the fragmentation of activity hypothesis (Lenz & Nobis 2007) which refers to the process of ICTs affording individuals to ‘disaggregate’ activities into smaller bundles of acts that can be achieved at multiple places, different times and in new sequences. As a consequence, the contact set — the set of geographical locations that are contacted physically or electronically mediated — ‘explodes’ from one to many per activity. For example, wireless ICTs afford many simultaneities to occur such as emailing while travelling, or chatting with a friend in work time (and checking facebook)! Multi tasking and fragmentation may also blur the boundaries between work and domestic spheres of life and augment the need to spatially and temporally coordinate face-to-face meetings, family life and work-related projects using the mobile phone and other digital media ((Licoppe, C 2008); (Schwanen & Kwan 2008). How does this impact family togetherness — is it possible to be present, but absent, and multi-tasking? What is the impact of ICT affordances on the family environment, given young people’s propensity for multi-tasking?

Media choice and family activities

It is worth considering what factors might influence the choice relating to media use in family households. In their ethnographic study, Bryce & Leichter (1983) investigated the influences of basic processes of family life on patterns of television use, and established that families have significantly different patterns of TV use depending on interpersonal communication style. The primary focus of their research was on mediated communication between family members, and its facilitation for education about the everyday world in a family context. The authors conclude that the temporal and spatial location of the TV set will influence and mediate what is viewed, and the family activities associated. Television sets that are visually and aurally accessible from the hubs of social interaction are more likely to be viewed more often than are televisions that are socially isolated (Bryce & Leichter 1983). There is also research on what adolescent children are watching on television, at times avoiding ‘family hour’ and confirming that viewing habits are altered if television sets are in kids’ bedrooms (Nie & Hillygus 2002). Bryce & Leichter (1983) identified that temporal aspects also have an influence on the organisation of family activities — such as watching television in ‘lag time’ (time between major activities of the day); or planned time (where the whole family planned viewing activity). Alternatively television had been identified as a primary activity for some families — devoting large blocks of time to TV viewing, whereas other activities are scheduled ‘at the end of’ the program. In regard to recreational computer activities, it has been asserted that the more time individuals spend on the computer, the less time is spent with family members and friends (Nie & Hillygus 2002). Additionally, Mesch (2003, 2006a) found that adolescents’ use of Internet for the purpose of leisure and amusement contributed to intergenerational conflict within the family. However, when technology was used for educational purposes, this was perceived as creating a closer parent-child relationship. The agenda and nature of computer use clearly impacts on the perception of the use by family members. Another issue seen to potentially contribute to intergenerational conflict between family members relates to the balance of power within the family. Families are social systems where parents are at the top of the authority hierarchy. When a technological innovation (such as a computer) enters the system, it stimulates social change, discernible in family members’ role performance and specialisations (Mesch 2006a). For instance, an adolescent can threaten to change the family hierarchy of parental authority in his or her new role as the family expert on computers by becoming the family member that is relied upon for any technical assistance. This traditional role reversal creates a power imbalance and will likely be the cause of family conflict, impacting on family time together. The positive aspect of this scenario is that the adolescent’s expertise enables wider applications and use of ICTs by all family members (Mesch 2006a). Facer, Furlong & Sutherland (2004) contends that where there is

competition for computer access in homes, specific and strategic rules needed to be created regarding the duration and frequency of children's computer use. 'The construction of household 'rules', which are negotiable rather than determinist in practice, reflects different family views about how time should be spent in relation to media' (Tutt 2008, p. 2335).

It has been argued that the amount of time spent with electronic media, may not be indicative of individual preferences, but rather symptomatic of the availability (or lack thereof) of alternative leisure options (ACMA 2007; Gleave 2009; Livingstone, S 2002; Livingstone, S & Bovill 2003). Livingstone (2002) identifies that children's first choice is often to spend time away from home and family in non-media recreation, such as going out, playing sport, or visiting friends. However, young people encounter various restrictions on their freedom, and therefore stay at home and spend time with media instead (Livingstone, S & Bovill 2003). According to Gleave (2009) 'play has become an 'unaffordable luxury' in modern society, pushed aside to make way for organised activities which are seen as more educational, or television and gaming technology that has taken over from more traditional forms of play' (p6). Others argue that children seem to be spending an increasing amount of free time within the home, partly due to advances in television and gaming technology (Karsten 2005). Moreover, it is claimed that parents' perceived fears of the outside world as unsafe for children and young people (Carver, Timperio & Crawford 2008; Coulson & Maudsley 2007) may also contribute to the increased use of ICT in the family home — as children and teenagers experience a sense of entrapment in the home, and escape via electronic media.

More research is required in understanding the juxtaposition of family and the use of ICT to provide greater insight into the interplay of the diverse and dynamic elements therein.

Links between ICT use and family togetherness

A vision of family togetherness incorporates the idea that family members choose to spend time with one another, favouring each other's company over the competing attractions of the external world. Suburban homes are fitted with central heating, air conditioning, and a plethora of entertainment devices able to occupy and amuse family members in their leisure hours. It has been put forward that the social and spatial structure of suburbia fosters family isolation (Miller 1995). Daly (2001) identifies that the concept of family time is tied to traditional family values that may not be readily achieved in today's work and family settings, and that families yearn for more family time, but find it an elusive prospect.

In a recent study conducted by Lanigan, Bold & Chenoweth (2009), the researchers found that the perceptions of the majority of participants about the impact of computers on family relationships was mostly positive. Qualitative research was undertaken to investigate further what this means (the following information is a brief overview of Lanigan et al's valuable research).

Improved family communication: current ICT facilitates more frequent, spontaneous communication via email, instant messaging; text messaging and mobile calls between family members locally and worldwide. The mobile phone encourages 'grooming calls' that show commitment and connection to the recipient and thereby reinforce bonds. It also provides safety and security between children and parents that are absent from each other, and maintains a connected presence between family members'. Moreover, ICT enables micro-coordination of family activities, and communication regarding the logistics management of those activities. However, ICTs can also support disengagement by reducing communication content, sending only text messages, or not responding.

Shared activities that enhance family relationships: ICT activities of mutual interest get the family together, however, if interests varied, connection between family members is diminished. Lanigan (2009) contends that families that use ICTs to identify and plan activities, and thus enhance their time together (in sharing the planning, and in doing the activity). Much research has investigated families' co-located activities, which does not necessitate or imply that family

members are doing an activity together — but are simply sharing the same time and space. Individuals and families are participating in a common culture that no longer relies on the co-location of participants. ICT provides for the displacement of activities in time and space.

There are many ICT activities that physically place the family together, but that does not imply ‘togetherness’ or ‘connectedness.’

ICT, family relationships and time spent together

There is ongoing debate regarding the role of ICT in maintaining, supporting or damaging social and familial relationships. New media is seen as encouraging individualised behaviours (Eggermont 2006), but family practices appear to be developing ritualised and activities that claim otherwise. Overall, media use has been investigated as a predictor of relational closeness or satisfaction with mixed results (Baym et al. 2007). As mentioned previously, the Internet provides families with access to online information on family related issues, participation in online family discussions opens access to social networks for support or advice, and Internet access has also contributed to improving children’s school achievements. Furthermore, computers and the Internet have the potential to strengthen the family unit by placing activities in the home (Lanigan, Bold & Chenoweth 2009; Mesch 2006b; Watt & White 1999).

Research undertaken by Christensen (2009) found that the dispersion of family members’ activities in time and space required increased coordination for individual and shared activities, and this necessitated attempts to ‘build family unity into their everyday life’ (p. 438) which was micro-coordinated via mobile phone communication. The temporal-spatial distribution of activities is linked to the process of individualisation — each family member operates in various domains of which home and family is one of many (such as work, school, leisure pursuits, peer groups and other activities). This coupled with multiple media devices in the home fosters increased privatisation of media use. The family spend less time together as a unit sharing media, especially as children grow into adolescents in the family development of life stages (Lanigan, Bold & Chenoweth 2009; Wartella & Jennings 2001; Watt & White 1999). Furthermore, recent research is recognising an ambivalence associated with ICT consumption and use — the absolute volume of mobile phone, television and computer usage would indicate an obvious interest and source of pleasure with consuming (and producing) ICT content. However, concurrently families are demonstrating anxiety, discomfort and negativity about the same usage (Sletteameås 2004). Parents with respect to media use, frequency, and duration also experience ambivalence and apprehension reflecting their daily struggles with normative expectations of ‘the good parent’ and ‘the good child’ (Livingstone, S 2007b, p. 923). In the attempt to research the regulation of media use in the family home, self-report surveys have provided conflicting information, revealing a high level of concern from parents (implying substantial attempts at media regulation); and where the children are surveyed, there is an apparent loose regulation of media. Coupled with this issue, is the fact that in the scheme of things, media regulation is not as high on the list of parental concerns as the potential for drug and alcohol use, or crime (ibid).

In reviewing the literature on ICT influences in family life; and in an attempt to determine whether clear links have been made between appropriation of technology and the type of family activities that might be ‘afforded’ to facilitate shared moments and rituals — it has become apparent that there are no definitive answers. In fact, only the tip of the iceberg has been investigated. Associations have been shown to exist between family situations and ICT use, and the findings to date have been helpful, but inconsistent. Past research has relied on surveys and self-report measures, which rely on participants’ perceptions, understandings, and memories of the issues under investigation. The concept of family time will have different meanings and nuances to different families. Family time & family togetherness need to be considered separately (Lee & Chae 2007). An ethnographic study by Christensen (2002) found that children value time spent with their families. This research distinguished between time spent together and how children perceived

‘quality time.’ There were five aspects of quality time identified as valued by children: ‘ordinariness and routine’, ‘someone being there for you’, having a say over how they spend their own time’, ‘peace and quiet’ and ‘being able to plan their own time’. There needs to be more research that develops consistent concepts and frameworks to build upon.

We need to know what these inconsistencies mean. Are causal relationships able to be established between ICT use and family activities? Or, do the measured effects occur at the extreme ends of the behavioural spectrum? Perhaps we cannot ascertain ‘meanings’ of ICT use in and of itself? It is proposed that inconsistent and conflicting research outcomes are indicative of differences in how family time is conceptualised and defined, inappropriate data collection, and a neglect to consider family characteristics (Lanigan, Bold & Chenoweth 2009).

More research is needed to examine the interaction between family functioning and technology integration

There is an ongoing need to examine the dynamic nature of technology in the family context to facilitate a better understanding of how technology influences family life (and how family life influences technology). Embedded technologies in households has led to a reduction in fears and anxieties associated with ICT in family households — kids are growing up with it, the parents are becoming familiar with it — it is no longer considered ‘exotic,’ but part of the mundane, routinised family activities.

A developing research area is looking at intimacy in the family context, especially between parents and children. The focus has been largely on designing technologies to support interactions and intimacy between children and parents in various family situations.⁴ In determining new technology design, there needs to be a comprehensive understanding of the nature of the interactions between family members. As a result, research is emerging that studies the phenomena of interactions in family and social contexts that requires alternative methods to elicit tacit knowledge about routines or habits (Bell, Blythe & Sengers 2005; Dalsgaard et al. 2006; Kjeldskov et al. 2004; Vetere et al. 2005).

A number of scholars have drawn attention to the fact that research has neglected to apply family conceptual models to aid our understanding of how ICTs affect family life (Kayany & Yelsma 2000; Lanigan 2009; Lee & Chae 2007; Mesch 2006a; Watt & White 1999). There is an immense amount of research literature that has concentrated on adoption, usage and diffusion patterns, or specific individual (or isolated variables); and an increasing amount of research is devoted to qualitative methods, especially ethnography to expand and progress our knowledge, deepen our understanding of the human, contextual, social, cultural and technological interfaces (Arnold 2004; Bell, Blythe & Sengers 2005; Crabtree & Rodden 2004; Holloway, Donell & Green 2008; Shepherd, Arnold & Gibbs 2006; Silverstone, Hirsch & Morley 1991). Livingstone (2009b) contends that media is meaningful because it facilitates and encourages coordinated human activity, and also helps people understand the world and their position in it. As the technology is becoming deeply embedded into our homes, we take for granted the external interactions and internal dynamics in our family relationships, unaware if how new or existing media influences us. Family developmental and sociotechnical models are being established to provide improved analytical tools that recognise the heterogeneity of families, and capture the complexity of family-technology interactions. The purpose of this paper was to review the literature on ICT use and family behaviours and focus on the Australian context. A number of gaps have been identified, and many questions posed regarding the nature of the challenge to explore families and ICTs.

⁴ See International Journal of Human-Computer Studies special issue on the family and communication studies, 2009 Vol 67(2).

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