NEW TECHNOLOGY ADOPTION AND FACTORS AFFECTING FAMILY FUNCTIONING

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ABSTRACT

Title of Dissertation	New Technology Adoption and Factors Affecting Family Functioning
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This study is aimed to 1) study the new technology adoption of adolescents' families in Bangkok, 2) examine the situation of the possession and use of new technology, family communication, and family functioning of adolescents' families in Bangkok, and 3) investigate the factors affecting family functioning of adolescents' families in Bangkok.

Both qualitative and quantitative methods were used. Totally 12 families, adolescents and either their father or mother, were interviewed in 2017 for the qualitative research. Samples of adolescents under the quantitative research were selected via secondary schools and self-administered questionnaires were used for data collection in 2018. Data of 808 adolescents were analyzed.

It is found that the adoption of the new technology of adolescents' families is dynamic and comprises the following stages: 1) appropriation or the purchase and adoption of a computer in the house. Family members are found to own personal mobile phone, especially used for adolescents' education and convenience for communication among family members, 2) objectification or the placement of ICT in the house, both central and personal space. Mobile phones turn to become an indispensable part of life and in close proximity, 3) incorporation or the use of ICT in family members' daily life with different purposes and applications. Smartphones are the main digital device for communicating via social media. The use of ICT is found not only to enhance adolescents' education but also obstruct their education. The surveillance of their use of ICT thus focus on flexibility and requires loose agreement and rules, and 4) conversion

or the significance and impact of ICT on adolescents' families. Mobile phones are found to be counted as an organ. ICT functions as a teacher and brings about digital families in which children have higher digital skills than their parents. Besides, ICT affects family functioning. Families have to support one another by monitoring and teaching adolescents appropriate ICT use, adjusting their coping ways, finding other activities to lessen adolescents' screening time on games or social media, and consulting with people outside the families.

Among all digital devices, smartphones are the most popular that almost all adolescents possess. The average number of all digital devices in the house found in the study is 9.3 devices. 89.2% of adolescents are found to use the internet every day with one-third of their time or more than 6 hours per day averagely. They are found to have digital skills at a high level the most while the digital activities found the most are listening to songs or watching movies, using the social network, i.e. Facebook, Twitter, and getting into chat rooms, i.e. Line Skype, etc. Besides, most parents have lower digital skills of using the computer and the internet than their children, but fathers tend to have higher skills than mothers.

For the use of ICT for family communication, it is found that the use is for expressing members' love and support the most, followed by following the adolescents' studying, providing useful information to respond to members' needs, teaching on various matters, and listening for sharing happiness and unhappiness. Most families use ICT for family communication at a low level the most among all 4 levels, followed by at a moderate, quite high, and high level.

Moreover, family functioning found in this study is at a moderate level and "the nurture of a family's well-being" gains the highest mean, followed by "the establishment of family relations", "communication about media," "the establishment of relations with external networks," and "the cultivation of knowledge and skills." From the multiple regression analysis, 7 variables are found to have a positive relationship with family functioning at a statistically significant level: the use of ICT for family communication, having both father and mother living with the adolescent, very high digital skills of the person playing main roles in the use of ICT in the family, male adolescents, unemployed person playing main roles in the use of ICT in the family, the adolescents' digital skills, and adolescents in an extended family.

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If this dissertation would be useful for anyone concerned, I would like to contribute this integrity to all the aforementioned. However, if there would be any mistake, I would accept it solely and willingly.

Achara Entz

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figures **Page**

CHAPTER 1

INTRODUCTION

1.1 Background and the Significance of the Problem

At present, information and communication technology (ICT) becomes a part of our society, both in an individual's life and the development of all concerned dimensions, i.e. economics, business, education, politics, and culture. Thus, the meaning of ICT covers from electronic devices, e.g. home telephones, mobile phones, television, facsimile, fiber-optic cables, satellites, computers, and the internet, including software or programs, i.e. emails, world wide web, and online social media. (Gora, 2009; Carvalho, Francisco, & Relvas, 2015). It involves the collection of data, information processing, and information exchanges with other people. (Rogers, 1986, as cited in Stafford & Hillyer, 2012). Accordingly, the adoption and the use of ICT in daily life plays an important role in changing individuals' ways of life and society. For positive changes, it enables rapid communications and searching for information, However, for negative changes, it induces access to improper information, cybercrimes, the violation of individuals' rights, and adolescents' game addiction. Especially, due to easier accessibility, ICT can extend its accessibility from education institutions or organizations to people's residence. Nowadays, families can buy computers and connects them to the internet in their houses. They can also buy much cheaper mobile phones than before. Hence, this enhances studies on the roles and effects of ICT on a family's life increasingly.

ICT is usable in every place: education institutions, home, working places, internet shops, restaurants, and on the roads, and every time. Especially, when mobile devices become fundamental devices for connecting to the internet, and the use of social media is a common activity in daily life, all of these make a dividing line between personal and working time, and between physical and virtual reality unclear and cause many effects on social relations. (Anderson & Rainie, 2008), including causing some

anxieties to the family functioning because of the effects of ICT in enhancing interaction, personalization, and shifting the traditional distinction between private or intimate spheres, i.e. family, and the public sphere, i.e. a community, civil society, and states. (Ochiai, 2010).

Families are basic and very important units of a society. Generally, a person can start his or her family membership through a marriage and consanguinity or blood ties. Then, each family member has roles, functions, and relationships of the same generation and across generations via a communication process for exchanging his or her information, ideas, attitude, etc., and for creating mutual understandings. Weeks (2005) states that the functions of families are to produce human capital and social capital for their members, which are beneficial for them in their course of life and for developing their society. Consequently, a society has to give high importance to families, especially to children, with great concern if they have been brought up to be maximal human and social capital or not. (Weeks, 2005). It is undeniable that the relations between parents and their child or children play the main role in an individual's psychological wellbeing and social connectedness, leading to quality human and social capital that help to maintain the existence of a society. (Jamieson, 2006)

The advancement of new technology may help to supplement family functioning. Previous studies indicate positive effects of ICT on family relationships, especially it enhances an opportunity for parents and their child or children to do activities together, i.e. playing online games together or to search for tourism information for holidays. (Mesch, 2006) Moreover, family members who live apart can be social media members, e.g. Facebook, YouTube, Twitter, etc. and can exchange their information, images, ideas, experiences, etc. to know rapidly what is going on among them.

Still, ICT is comparable to a two-edged sword, even for a family. In Thailand, the National Statistical Office of Thailand (NSO) conducted a survey on the opinions of parents in Bangkok about their child's use of the internet or computer. It was found that a group of parents perceived their children's use of ICT lessened family relationships (National Statistical Office of Thailand, 2003). Similarly, the study of Pirongrong Ramasoota (2014) indicated the relationship between game online addiction and families and found that game-addicted children were found to be related

to families with poor strength. On the other hand, game addiction affected children's interaction with their family members.

In other countries, researchers have paid quite high attention to the study of the relationship between ICT and families. For instance, there have been several studies under large longitudinal research projects on the use of the internet. The Pew Internet & American Life, The USC World Internet Project, and the HomeNet project of Carnegie Mellon University (2009) pointed out several concerned issues, i.e. the challenge of internets that called for high attention to parents who desired their children to gain benefit from online information, but on the contrary, tried to protect them from inappropriate content. Besides, it was found that parents and their children had equal skills in viewing TV, but their children earned more internet skills than their parents; thus, it was difficult for parents to control their children's exposure to the internet. (Lenhart, Rainie, & Lewis, 2001). Another piece of research found that ICT made children lose their educational and working opportunities since their parents could not advise them on how to use ICT properly to develop their children in various ways. (Ranger, 2005) On the other hand, Wang, Bianchi, & Raley (2005) found that parents followed their children's use of the internet because they believed that it was a part of their functions as good parents. However, it was further found that too worried parents tended to use such rigid methods that their children did not realize the danger of social media. (Ranger, 2005).

To prepare the readiness for the national development, Thailand determines to use ICT as tools, i.e. Curriculum development for formal and non-formal education systems, the creation of continuous learning culture for people of all ages, and the promotion of families for applying life skills to teach and advise their children. (Office of the National Economic and Social Development Council, 2006). Furthermore, it was found that the ratio of the use of ICT of the population aged six years up in Thailand had been increased continually since the survey in 2004 until 2018. Especially, internet users increased from 11.9% to 56.8%, mobile phone users from 28.2% to 89.6 %, and families having internet connection from 6.2% to 67.7%. (National Statistical Office of Thailand, 2015; National Statistical Office of Thailand, 2018).

In spite of the pervasiveness of ICT possession and usage, the digital divide or digital inequalities among people in a society, is still apparent. At the regional level,

the proportion of the users of a computer, internet, mobile phones, and families having computers connected to the internet in Bangkok, the capital and the center of all kinds of prosperity and growth of the country, is higher than other regions. Specifically, in 2018, 46.5% of people used a computer, 77.5% internet, and 94.7% mobile phones while 41.9% of families had computers and 83.3% of them had computers connected to the internet. (National Statistical Office of Thailand, 2018).

Normally, a family may compose of a population of several generations; thus, their personality and skills in computers and the internet are unequal. Young or adolescents up to early adults nowadays are familiar with the internet and new media and have such skills. On the contrary, adults of older age will not be familiar with them and may perceive them as disgusting and complicated. (Kim & Kim, 2001) so this leads to a generation gap and the incongruence of ideas. From the survey of National Statistical Office on the families' use of information and communication technology during 2014-2018, it was found that Thai people aged 15-24 years old had the highest proportion of using the internet in all studied years, followed by people aged 25-34 and 6-14 years old respectively, as illustrated in Table 1.1

Table 1.1 Percentage of internet users among the Thai population aged 6 years old up during 2014-2018, divided by age groups

Year.	Age (years old)				
	6-14	**15-24**	**25-34**	**35-49**	**50 up**
2014	58.2	69.7	48.5	25.9	8.4
2015	58.0	76.8	60.1	31.8	9.6
2016	61.4	85.9	73.6	44.9	13.8
2017	63.4	89.8	80.3	54.9	18.2
2018	69.6	91.4	84.4	62.1	21.2

Source: National Statistical Office of Thailand, 2018**.**

The population who uses ICT the most is childhood population up to early adulthood is called, “The Net-generation” or "E-generation," who is familiar with the internet and new media so much that it becomes a significant part of their lives. Besides, they have been brought up or socialized in their house through the use of ICT and social

media, besides their interactions with other people in a society. Subsequently, ICT decreases the functioning role of families concerning socialization. (Garcia, 2016). According to the World Health Organization (2011), "adolescent" (or "teenager") means the population aged 10-19 years old. This group of the population has been given high importance from society since it is the turning point of human growth and development in all dimensions: physical, psychological, and social, from childhood to adulthood. They have to learn about sex roles, social norms, and expectations, including their interest and career development in the future. Accordingly, they have to participate in new social activities, which are different from their previous ones. Adolescents also start to have the need of being independent or freedom from their parents and develop their self-reliance ability. (Eshleman & Bulcroft, 2006).

At present, Thai society is attempting to catch up with ICT advancement; thus, family members, especially parents of today and the future, have to prepare to face ICT usage and its impact on their families. On the other hand, children who deserve to be nurtured and protected by their parents, and to be developed towards quality human and social capital, may not be able to optimize the use of ICT as they should. From the review of literature on families and ICT, it indicates that the study in this area is still in a small amount while Thailand is still facing the digital divide and possesses different cultural contexts from those of the developed countries. To understand Thai families' adoption of new technologies and the factors affecting the family functioning is thus crucial because if families have poor or no-quality functioning, an opportunity for developing their off-springs or children towards a good quality of life should be tremendously affected. This research thus aims to study adolescents' use of ICT and new media in Bangkok, which is the province with the highest proportion of ICT use in the nation. The data obtained from adolescents and their families will help to reflect the impact of ICT and new media on families. Besides, it will help concerned organizations to know more about the family functioning in Bangkok, which will be fruitful knowledge for determining any measures to strengthening Thai families and for developing more well-being families in Thai society.

1.2 Research Objectives

1.2.1 To explore the adoption of the new technology of adolescents' families in Bangkok.

1.2.2 To examine the situation of the possession and usage of new technology, family communication, and family functioning of adolescents' families in Bangkok,

1.2.3 To study the factors affecting the family functioning of adolescents' families in Bangkok.

1.3 Scope of the Study

1.3.1 Families in Bangkok comprising at least 1 adolescent and adolescents' parents, either a father or a mother, including other people living in the same house.

1.3.2 Adolescents mean young people aged 12-19 years old studying in a formal secondary-education school. Thus, the ages of the samples are different than those defined by the World Health Organization, which are 10-19 years old.

1.3.3 New technology means new ICT or digital devices, e.g. computer, tablets, internet, mobile phone, and social media. Thus, the word, "ICT" and "digital devices" are also used to represent new technology.

1.3.4 Family functioning and the use of new technology in this study were the family functioning and the use of new technology the samples witnessed in their house six months before the study to ensure that the experiences in the phenomena to be studied and the coverage of the studying period of the secondary-education students.

1.3.5 In the qualitative research, "a family" is a unit of analysis while in the quantitative research, "an adolescent" in each family is a unit of analysis. Since the use of new technology and family functioning of a family is perceived and reported by each adolescent in each family. Thus, the word "adolescents' families or family" and "adolescents' are used in the findings interchangeably to represent the portrayal of a family.

1.4 Operational Definitions

1.4.1 The families' new technology adoption means continuous steps of actions of an adolescent's family, starting from bringing new technology into the house, adapting it to fit spatial and temporal dimension of the family, using it for daily-life, and using it to accommodate with social and cultural environment towards the family members' maximal benefits.

1.4.2 Digital divide means inequality in using ICT among populations of a society in terms of the accessibility, possession, skills, amount of usage, and activities using ICT towards intellectual and cultural benefits, quality of life promotion, and life-opportunity expansion. In this study, the factors of digital divide among adolescents leading to different family functioning are the quantity of household digital devices, the connection to the internet, adolescents' amount of internet usage, adolescents' digital skills, adolescents' digital activities, and digital skills of the family member who is responsible mainly for the usage of ICT in the family.

1.4.3 Family communication means the exchange of information, ideas, and attitude and the establishment of good understanding among related family members, including mechanisms in functioning the roles in a family.

1.4.4 Family functioning means a family process comprising members with a relationship, interdependence, and functioning by roles, including adaptation responding to changes to satisfy their needs and the external society and to bring happiness and well-being to a family. The family functioning in five roles is as follows:

1.4.4.1 Cultivation of knowledge and skills means a family's action or expression in helping family members to acquire useful knowledge and skills.

1.4.4.2 Nurturance of well-being means a family's action or expression in enhancing family members' well-being.

1.4.4.3 Communication on media means a family's action or expression in providing knowledge about media for family members.

1.4.4.4 Family relations establishment means a family's action or expression in creating love and attachment among family members.

1.4.4.5 Establishment of relations with external networks means a family's action or expression in creating a good relationship with external networks, i.e. neighbors and communities.

1.4.5 New technology means electronic devices whose functions covering from data collection, processing, and exchanging information with other people, e.g. computer, tablet, internet, mobile phone, and social media.

1.5 The Expected Benefits from the Study

1.5.1 Empirical data on the adoption of the new technology of a family, family functioning, the situation of adolescents' possession and usage of new technology, family communication, and the factors affecting the family functioning.

1.5.2 Extended knowledge of concepts and theories used in this research towards future studies, i.e. Functionalism, family systems, family communication, digital divide, human capital, and social capital.

1.5.3 Applied information for setting policies and operational plans of concerned organizations, i.e. the Ministry of Education, the Ministry of Social Development and Human Security, the Ministry of Digital Economy and Society, and the Ministry of Public Health.

CHAPTER 2

CONCEPTS, THEORIES, AND RELATED STUDIES

In this study, a number of disciplines, i.e. Communication, Demography, Sociology, and Psychology, are used to develop a conceptual framework and research hypotheses, including constructing measurement of variables for this study as follows.

2.1 Concepts and Theories

2.1.1 Functionalism or Functionalist Theory

Functionalism or functionalist theory is a theory used for developing a conceptual framework of this study because the core issue or the heart of this theory is "functions." Functionalism is a large school of thought in the field of sociology and anthropology since the nineteenth century. In the field of communication, it was introduced by R. Merton (Kanjana Kaewthep, 2000). The foundation concept of this school is its biological organism model comprising sub-organs operating each function to keep the stability, unity, and maintenance of the system. Whenever any problem occurs in a system, i.e. microorganisms enter our body, our body will find ways to adjust or keep the system back to its equilibrium or homeostasis.

A function here means an important process in which all subsystems operate to respond to the needs of the system to maintain the system through an interdependence among subsystems and manifest activities. (Kanjana Kaewthep, 2014). Nevertheless, the explanation of functionalist theory is not a causal relationship. (Kanjana Kaewthep, 2007). Instead, what this approach concerns are sub-institutions of society is functional or dysfunctional (or dysfunctional). It also involves the concept of a manifest function that is a function that is intended, recognized, and observed and the concept of latent function that is unintended and scarcely observed. Besides, it covers an equivalence function or a function of a sub-institution for another sub-institution. (Kanjana Kaewthep, 2007).

The functionalist school of thought views a family as one of the sub-institutions of a society functioning in the role of adapting to and interacting with other parts of a society with the main goal of maintaining the stability of the whole system. In this study, a research question is thus raised if and how the functioning of a family institution changes when ICT, or new technologies, as another sub-institution, enter a family.

2.1.2 Media Ecology and New Media Theories

McLuhan (2003, as cited in Griffin, 2009) proposes "media ecology theory" for explaining the influence of media on individuals and society. This theory believes that media should be understood from an ecological approach. Namely, technological changes affect human perception, experiences, attitudes, and behaviors. The main concept he proposes is "the medium is the message," or in the other words, he believes that media is even more important than the message since the predominant media in each period causes a greater effect on people's ways of life than the message being conveyed.

Furthermore, McLuhan divides human history into four ages:

1) Tribal age is the period of face-to-face communication. Listening was valued more than seeing since it made human beings more aware of the things surrounding them. Listening led to the promotion of community-ness, the maintenance of ideas and events through oral history, repeated storytelling, and continual transmission.

2) Literate age is the period of written communication and inscription. Seeing turned out to be more important since it enabled people to see words that can be read and reread. A collectivism orientation turned to be a more individualistic orientation.

3) Print age is the period of printing revolution in which a huge amount of printed work could be publicized in each time. People could acquire news from printing and used seeing and reading dominantly. It thus yielded an effect in the form of idiosyncrasy and emotional isolation.

4) The electronic age is the period of returning to tribal age but in different kinds of communities. Instead, it is the global village as electronic media enables people to connect to all people at any place at any time. Privacy is then scarce and people pay more attention to other people's affairs.

Griffin (2009) adds the fifth age, namely "digital age," as a consequence of the electronic age. McLuhan's theory is used to explain the impact of digital technology on individuals and society. It is said that the emergence of new media is the consequence of information and communication technological development at the end of the 20th century. Digitalization and computers are the main components of such an operation. Asawin Nedpogaeo (2018) defines "new media" as "media which facilitates both senders and receivers to perform their roles simultaneously, which is interactivity or interactive communication via the internet. Such communication can also send and receive images, audio, and texts at the same time. Thus, new media can be called "digital media" since new media is functioned by digital technology. This technology leads to the integration of several media or media convergence, i.e. Smartphone(s), etc., which can increase communication effectiveness in the modern world. Besides, digital media also has a similar meaning to “multimedia” due to its media convergence capability.

Owing to the impact of information and communication technology, our society becomes a borderless globe comprising social networks, which have been expanded from interpersonal-engagement networks, i.e. families, friends, and acquaintances in real life to huge networks in the internet world, which is named, “online social network” (Asawin Nedpogaeo, 2018). New media is thus used widely in creating social networks, leading to new terminology, "social media." Accordingly, human experiences can be obstructed by neither distance nor time.

On the other hand, information and communication technology changes induce a change in consumers' ways of life as well since they can access any information rapidly through digital media. The status of "consumers" then changes to "prosumers" or persons who are both producers and consumers. Besides, consumers change to be more active receivers. (Toffler, 1980, as cited in Nisara Sriployrung and Parichart Sthapitanonda (2017). For this study, it is anticipated that new technology

penetrating individuals’ and families’ life should bring about changes or affect families’ functioning.

2.1.3 Concepts on Family, Family Characteristics, and Home

A family means a group of two people or more living together by blood, marriage, or adoption. (Weeks, 2005). Thus, a family has its nature as a kinship unit in which members have social relations, i.e. the acceptance of rights and commitment or obligation of one another, including responsibilities for the well-being of one another. Families can be divided into a) a single-family or a nuclear family and b) an extended family. (Weeks, 2005). A nuclear family means a family in which only parents and their dependent children living together while an extended family means a kinship of more than three generations living together, i.e. the nuclear family plus the wider kin, e.g. grandparents. (Institute for Population and Social Research, Mahidol University,2004).

Week (2005) identifies the characteristics of a family as follows: 1) Geographic location of a family, which influences the level of social, cultural, economic, and physical capital available for a family, i.e. urban or rural areas. 2) Social location in a community, which influences the accessibility to local resources, e.g. social and economic status. 3) Social structure or the numbers, age, sex, and interdependence of family members. All of these three characteristics influence several opportunities in life, e.g. education, work, marriage, etc.

Concerning the issues of families in the field of communication, especially in the study of the use of new technologies, the presentation of concepts on a home in parallel to concepts of families are found. According to Silverstone (2006), at present, although the surrounded boundary separating personal and public space disappears, home is something we cannot miss. Homelessness indicates living without an identity and ontological security. Home is also a starting point and foundation for making an understanding of social dynamics involving media changes. Cheal (2008) explains that in Europe and America, the concept of home is similar to that of family or as a unit of privacy. Until the end of the eighteenth century up to mid of the nineteenth century, the home became physical space and a spatial symbol different from other spaces because home is a private living place and a place of a nuclear family for

bringing up their child or children. Besides, home is a symbol of experience of togetherness and happiness. The main responsibility of women is to maintain home as a sacred place for family life. Until the end of the twentieth century, a family and home

have become a cognitive system related to a family in which women have been in their privacy place and men in a public place. The ownership of a house is vital for assuring a family's financial security, including a place where family members are free to do anything they want.

Venkatesh, Kruse, and Shih (2003) wrote an article entitled, “The Networked Home: An Analysis of Current Developments and Future Trends,” and define “Home” as a living space composing of three main structural components: a) Social space comprising family members, activities in a house, time used in conducting activities, and interaction among family members. b) physical space means a physical layout of a house and other rooms, i.e. a kitchen, a bedroom, a toilet, etc. and c) technological space means technologies composed in a physical space and used by members as a part of social space. Besides, Venkatesh, Kruse, and Shih (2003) propose that a living space can be compared as a kind of eight centers: activity, entertainment, work, shopping or financial, family interaction, information, communication, and learning center. All of these centers have been evolved through time from the past to the present time and reflect family relations in using a space for technological development. In 1950, technologies involved with activities for saving energy and time, e.g. cleaning, cooking, etc. Later during the late 1950s and the early 1960s, televisions turned a house to be an entertainment center. In the 1980s, computers enable members to work at home and a house became a work center. Until since the 1990s, new media and technologies, especially the internet, have changed home rapidly to become all kinds of centers, i.e. shopping, family interaction, information, communication, and learning.

The concept of a family, in combination with a family’s characteristics and home, leads to two major issues for this study:

1) The use of ICT at home. In this study, it covers the following structural components of a home, i.e. social space, technological space, and a center-being of home-based on Venkatesh, Kruse, and Shih (2003), e.g. activity, entertainment, work, shopping/financial, family interaction, information, communication, and learning.

2) Factors related to the functioning of a family comprise a family’s characteristics based on the concept of Weeks (2005) in the social-location dimensions, i.e. a family’s income, parents’ occupation and level of education, and social-structure dimensions, i.e. types of family, a living with parents, and the numbers of members.

They also include additional structural components based on the concept of Venkatesh, Kruse, & Shih (2003) in the technological-space, i.e. the numbers of ICT and internet connection at home.

2.1.4 Family Systems Theory

The family systems theory was developed from general systems theory of Ludwig von Bertalanffy, a biologist, and Norbert Wiener, a mathematician, and engineer. (Segrin & Flora, 2005). The elements that became a foundation of family systems theory have been introduced since 1920, but have been well recognized explicitly since 1960. For general systems theory, it sees a system as a series of interrelated sub-elements, which are encompassed by the scope and express some attributes. Accordingly, a family is a system composing of interrelated and interdependent family members. As a consequence, this theory gives importance to two issues of a family: elements of family systems and a process in a family and between a family and its environment. (Chibucos, Leite, & Weis, 2005). Besides, family systems theory also covers the following main concepts:

1) Interdependent components: family members and their roles expressing the status of being a part of family systems. Burr (1995) illustrates that motherhood is conveyed with the meaning of having a child. Being a husband must be conveyed with the meaning of having a wife, or an elder sister having a younger sister, etc. Family members live interdependently at different levels. Such interdependence is not only a glue sticking family members together, but it also indicates the nature of a relationship within a family. The interdependence of family systems causes a continual effect on all members if any change occurs to any of the members.

2) Inputs/ outputs. Inputs are the processed information a family member. Receives, which may affect family functioning. The inputs may come from inside and outside a family in various forms, i.e. information from schools used for selecting a school for a child to study, information on food that affects kinds of food for consumption, etc. For outputs, they can cover from disposed of trash out of a house up to a child as a member of society. (Segrin & Flora, 2005)

3) Boundaries. They are what encompasses each family system to separate. Between a family and environment and what gives the meaning of people, inside and

outside a family. The property of boundaries depends on how strictly information is allowed to enter or leave out of a family system. A family with a high level of strictness will be affected by any event or surrounding information at a low level and family members are isolated from the surrounding environment. For instance, families with more flexible boundaries may allow other people to live in their house or let their child or children study abroad. (Segrin & Flora, 2005). Burr explains that a part of boundaries is plenty of rules within a family, i.e. who will be allowed to enter a certain room, which belongings are classified as personal belongings, who are or are not family members, with whom family members can get acquainted, etc. Thus, boundaries can be flexible and adjustable, i.e. by a member's life circle, etc.

4) The hierarchy of systems. It can happen within or outside a family system.In a family system, there is a hierarchical lineup of sub-systems. These sub-systems are individual, spousal, parental, and sibling subsystems. These sub-systems can indicate the paradigm of relations among family members. Each sub-system is encompassed with in-and-out boundaries like a large system. Besides, they have different power. Subsystems outside family systems are systems of schools, communities, society, culture, economics, and nation respectively. (Scantlin & Jordan, 2006; Umaporn Trangkasombat, 2011).

5) Rules. A system can be maintained by rules, which are understood and accepted by members. Rules determine members' interaction in all dimensions: behaviors, roles, power schemes, emotional expression, and communication.

6) Goals. Family systems proceed to achieve a goal that can be adjusted by the length of time in which members are grown up and change. This concept proposes that members' interaction and behaviors are for achieving a goal and goals are connected until they become rules and boundaries of family systems. However, the goals of each family system may differ from the goals of each member.

7) Feedback mechanisms. A family is equipped with a mechanism for following its status consistently. A family can maintain its homeostasis for the functioning (Segrin & Flora, 2005) and for following up if its functioning accords with the goals of the system. If members realize any incongruence between the system's goal and members' goal, they will modify their behaviors to keep their family's homeostasis. Negative feedback is given when members have deviated behaviors from the family's

standards while positive feedback is for encouraging a change from the determined standard. (Segrin & Flora, 2005).

8) Non-summativity. Whereas family systems compose of components or Subsystems, it cannot be perceived as only a merger of sub-systems or sub-units within a family, but they also determine the wholeness of a family. Non-summativity is a key principle of a system. The entire idea behind nonsummativity is that as a group together, the members are equal to more than simply the sum of their parts. Therefore, from the sub-systems in a family: interaction patterns, spiritual and resource coordination, family functioning, etc. All of these signify family systems. Accordingly, to make an understanding of a family system, it is necessary to consider a family as a group or the sum of its parts and to understand every component and interaction of each component. Burr calls this concept "wholeness" or "holistic" view of a family. Scantlin and Jordan (2006) add that if a family wants to know how their children spend their time, according to this concept, the family has to understand them from the nature of their surroundings, which comprise other members who play a part in proposing various occasions for children to spend their time.

9) Change. Since family systems will be re-organized and adapted by new interaction schemes to respond to ICT and new technologies, their attitude and behaviors can be influenced by internal and external factors, i.e. technology, attitude and behaviors of other members, etc. (Scantlin & Jordan, 2006). Therefore, family systems face a change in their fundamental structure and their functioning after time passes by. Besides, it is important to understand how a process and pattern of change affect family systems. Burr (1995) and Segrin and Flora (2005) add that normally systems tend to find ways for establishing stability; thus, systems will have an ability to adapt themselves to surrounding environment or what happens in life, which relates to a family's rules and behavioral patterns, i.e. a timetable of a family may change after a kid goes to school, etc.

10) Equifinality. Equifinality is the principle that in open systems a given end state can be reached by many potential means or the ability to reach the same goal in different ways. Different family systems may achieve the same goal with different methods or processes, depending on the characteristics of each family system. For example, each family has different ways of earning income for the same goal or to

support the family. Another related concept is "multifinality," which indicates that the same inputs or same methods can achieve different goals (Segrin & Flora, 2005), i.e. each family may have similar characteristics but children may still be different.

Family systems theory is a widely-used theory in studying a family; however, it is criticized as being unable to find the nondeterministic foundation factors of a family due to its philosophical perspective in nature. This concept is similar to the aforementioned functionalism theory. For this study, family systems theory is used to develop a conceptual framework based on the assumption that a family composes of members, with mutual relations and interdependence, performing their functions as specified roles to respond to the needs of members and external society and to achieve some goals. For instance, parents need their children to be successful in life by establishing human and social capital for them, supervising and screening what they think is beneficial for them, etc. To enable a family to do so, a family will create some boundaries and rules for a co-existence or for living together. When any change occurs in a family, i.e. some members are older, they have to adjust their behaviors or adjust the rules to match with new things they face, including a large amount of other environmental systems: a working place, schools, internet shops, friends, etc. Once communication technologies play a role in a society, i.e. as a tool for working, studying, entertaining, communicating, etc., parents may decide to accept or not accept those technologies to be adopted in a family by trying to keep its homeostasis through the adjustment of rules and methods. Normally, communication technologies can affect family systems, both in functioning and relationships, including yielding an impact on each member. For example, a sibling subsystem may require a sibling to adjust their communication-technology usage behaviors. Scantlin and Jordan (2006) and Jennings and Wartella (2004) suggest that parents should concern every subsystem. Examples of some concerns are how the parents, who are often worried about types of information to which their children access, tend to think about these communication technologies, who, in a family, controls such exposure, how parents create rules for the use of communication technologies, how they draw boundaries for such usage, how they follow up the situation, and how parents adopt or accept the exposed new technologies to keep a family’s homeostasis or happiness.

2.1.5 The Concept of Domestication of Media and Technology

The concept of domestication of media and technology is the theory used to explain the adoption of technology and media, adapted from the Innovation Diffusion of Everett M. Rogers. This theory compares the process of adopting or making the innovation, especially new technology, appropriate for users to the process of taming wild animals. In the past, the theory was initially developed for understanding the process of adoption and usage of new media in the house or for household purposes; however, it has been expanded to explain phenomena in working places, academic institutions, and even in national contexts. The concept of domestication of media and technology gives importance to the usage and symbolic representation of the adoption and uses of technology as a part of human life. It also emphasizes the roles of users and innovation. Another major concern is research methodology. Most of the studies on this topic tend to be qualitative research aimed to explain the meanings of technology and occurred changes on what individuals practice regularly, including conflicts, which normally cannot be studied by quantitative research (Berker, Hartmann, Punie, & Ward, 2006)

Besides, Silverstone (2006) divides the process of the adoption of ICT in the house as a part of people's life into four stages:

1) Appropriation. In the early stage, the ownership is highlighted. Technologies are adapted to be appropriate for each owner. When technologies are bought and possessed by any individual or house, it is a spatial-crossing from the public sphere to private or personal sphere and then a new technology or media life begins or is tamed or owned.

2) Objectification. In the second stage, technologies are used to express owners' value, taste, or ways of life via a physical and symbolic appearance in the house, including spatial and temporal arrangement, or the ways they are properly used to suit their regular timetable or their habits. "Home" is still a central place for using or disposing of technologies in this stage.

3) Incorporation. This third stage involves how technologies are used by concerning time or temporal dimension. Namely, technologies can be considered as incorporated into the house when they are used heavily or frequently.

4) Conversion. This last stage involves the relationship between individuals' or families' stories or phenomena and their external world or public sphere. In other words, it is the stage where the significance of meaning or statement expressing ownership of technologies is presented or conveyed to the outside world or the public.

In summary, this concept tries to explain or find a focal point that technology and human beings can adapt to each other and co-exist towards maximal benefits without conflicts. This research uses this study as a framework for qualitative research to understand families' adoption of new technologies.

2.1.6 The Concepts of Family Functioning in Creating Human and Social Capital

Whether a family can be maintained with happiness or not depends on its effective functioning and how effective it is. The functioning of a family is a vital factor for the life of people of all ages: children, adolescents, or adults. (Umaporn Trangkasombat, 2011). Thus, the functioning of a family is the main and interesting issue for this study. The researcher aims to study how it is affected by communication technologies based on the functionalist theory relating to functions of a family, and family systems theory paying attention to a family process and the development of measurement of family functioning, in combination with concepts of human and social capital. Generally, a society can survive by the increased human capital and social capital unceasingly. A family is a social unit that adds human capital and social capital for society, both in present and in the future by good nurturance of a child who will become a quality population and human resource of the country. (Weeks, 2005; Kua Wongboonsin, 2007). Accordingly, the tasks of a family are another dimension of a family's definition. Such tasks are socialization, nurturance, development, financial and emotional support. (Segrin & Flora, 2005) All of these tasks are alike four important tasks of Podhisita (1994), namely to produce new members to society, nurture and support family members, bring them up, and socialize them. All of the mentioned tasks are the creation of human capital and social capital of a family, which is the main goal of a family.

Coleman (1988, as cited in Worawut Romerattanaphan, 2005) explains that physical capital can be perceived, measured, and almost-permanently fixed like most

of the other capital while human capital can be touched less than physical capital, but measurable and rather fixed. However, it can be increased and decreased. For social capital, it cannot be touched but fungible, depending on the context and measurement. Both human capital and social capital are related. Weeks (2005) states an opportunity in a family member's life, i.e. well-being, happiness, etc. is related to a) ascribed characteristics, e.g. sex, age, ethnicity, etc., which are influential social capital, and b) achieved characteristics, e.g. education, occupation, etc., which are human capital related directly to chances in life. Ascribed characteristics affect chances in life during the early stage as they consequently affect chances in accessing to some achieved characteristics, e.g. social status and social capital, which are important for creating human capital for a child. (Coleman, 1988, as cited in Lichter, Cornwell, & Eggebeen, 1995). Besides, the kinship of a family can also provide social capital for family members since it can create networks of people who can assist family members in some ways. Moreover, the economic or consumption subsystem can also enhance human capital for members in accessing resources.

In general, studies on human capital and social capital of a family emphasize the influence or impact of human and social capital on some phenomena of a family, i.e. a child's health, academic achievement, working opportunities, wages, etc. Besides, the measurement of family members' characteristics and a family's characteristics based on the concept of Weeks (2005), including the measurement of activities and behaviors leading to the creation of human and social capital are found. An example of the studies is the number of times parents give for their child or children, frequencies in participating in a community's activities, etc. The detailed concepts of human capital and social capital are summarized as follows:

2.1.6.1 Human capital

The concept of human capital has been introduced since the 1950s. Schultz (1961, as cited in Bryant, 1992) states that human capital is a diversity of human innate competence that is accumulated from a person's learning through life and can be increased by proper investment. Human capital is one of the production factors of Adam Smith (Schultz, 1971).

Schultz points out that human capital possesses very distinguishing characteristics as it is in human beings and is a source leading to a good quality of life

in the future. It is unsellable but ingrained as a part of production and consumption. Correspondingly, it should be invested, i.e. educational investment, etc. since education is culturally valuable and enhances a person's competency towards better work and income in the future.

Additionally, Becker (2006, as cited in Simmons, Braun, Wright, and Miller, 2007) defines “human capital” as the sum of a person’s knowledge, skills, and attitude while Healy and Cote (2001) defines human capital as a person's knowledge, skills, competency, and other properties that are beneficial for good quality of life at individual, societal, and economic level, but it can be differently developed by each culture. The development of human capital can occur at several stages in life from birth until death. It is an interaction between human nature and nurturance. It takes time for developing and accumulating human capital in a family, through education and training in school systems, through practices and socialization inside and outside the related subsystems, or their activities in daily life. Therefore, the roles of social networks and norms in creating a learning culture are essential all through a person's life. (Healy & Cote, 2001; Kilburn & Karoly, 2008). At an early age, a child brings some predisposed norms, social background, and attitude from home to learn new norms, habits, and cultural values from school or classroom. (Healy & Cote, 2001). Such a learning process in school helps to enhance some needed skills for future achievement in a labor market, e.g. skills in self-administration and skills in establishing relationships with others (Gaughan, 2002, as cited in Simmons, Braun, Wright, & Miller, 2007). Other components of human capital are health (Kua Wongboonsin, 2007; Kilburn & Karoly, 2008) and experience (Simmons, Braun, Wright, & Miller, 2007).

A piece of research supports that family background, society, and home, especially the support, determination, and teaching on good working habits provided by parents, affect students’ academic achievement. A significant family's support composes of five main areas: a family's working habits, educational advice and support, encouragement for inquiring and talking about various subjects, a linguistic environment (i.e. an opportunity for thinking and imagination), and determination and expectation on children's education. (Kellaghan, Sloane, Alvarez, & Bloom, 1993, as cited in Healy & Cote, 2001). It also involves many other factors, i.e. time given for children, parents’ human capital, time other concerned people (e.g. grandparents,

people responsible for taking care of children, teachers, etc.) given for children, including human capital of all those mentioned people, invested products and services, e.g. food, books, etc. Naturally, the roles and importance of these factors vary by children's ages (Kilburn & Karoly, 2008). For adolescents, parents' human capital, e.g. education, parents' time for common activities, etc., and fundamental factors in life, such as food, ICT, including communication technologies, are important for creating human capital.

Besides, there are some studies on the outcome of investment in children's human capital, measured by parents' education and income, while the outcome of children's human capital is measured by their education and income as well with a consideration on the effect of other family's characteristics, e.g. size of a family (Rossetti & Tanda, 2000). Furthermore, Lichter, Cornwell, and Eggebeen (1995) studied human capital by measuring dropout rates. Simmons, Braun, Wright, and Miller (2007) measured women's human capital in their study on the outcome of human capital and social support on the economic condition of rural women's families by the women's education, knowledge about resources of the women's communities, and their life-skills. Bryant (1992) measured human capital by the amount of time spending on the subjects' activities based on the assumption that while doing an activity, a person will bring his or her knowledge, skills, and psychological state to do it. All of these are human capital and can affect a person's productivity.

For this study, it focuses on the creation of human capital in adolescents' family to produce quality human resources for the Thai society based on the concept that a family is the primary source of human capital accumulation through parents' investment in doing any activities or behaving something relating to the provision of knowledge, good health, skills, and other beneficial properties for their children (i.e. involving in children's assignment, encouraging them to use ICT and new technologies for searching for data or information, taking good and sanitary care of their daily eating, giving religious teaching, and promoting them to comply with religious beliefs, etc.

2.1.6.2 Social Capital

Portes (2000) states that social capital is a sociological concept used in various fields of study and applied in different types of problems, including applying different related theories and units of analysis. The concept of social capital was

developed by Pierre Bourdieu and James Coleman, aimed towards the benefits for individuals and families from their engagement with other people. The studies in the later time define "social capital" as a) a source of social control, b) a source of benefits mediated by a family; for instance, a family supports children to study and inherit some desirable values and attitude, and c) a source of resources mediated by non-family networks, i.e. acquaintances can help to find a job or get some loans. For Coleman, an engagement in a community plays useful roles for an individual. For example, children can play outside their houses because the community is safe. Therefore, this concept is extended by Robert Putnam to cover the benefits for a community. Putnam (1993, as cited in Suwannee Khamman, 2008) defines "social capital" as "the distinctive characteristics of a social organization, e.g. trustworthiness or accountability, norms, networks, etc., which can improve the effectiveness of a society, or the patterns of social relations in the form of trust, norms, social networks, and communes towards the increased effectiveness of a society as a whole. Besides, Bourdieu (1985, as cited in Healy & Cote, 2001) defines it as resources acquired from social engagement, a network's membership, and identical norms compliance.

Hirschman (1984, as cited in Worawut Romerattanaphan, 2005) defines social capital in the same meaning as endless moral resources that will be useless if not being used while Fukuyama (1995, as cited in Worowut Romerattanaphan, 2005) compares social capital with basic nature embedded in each society that leads to performing some useful acts collectively**,** such as information, trust, and norms, that can be shared reciprocally in networks of their society. A family is a major source of social capital that can be created more easily than other sources in society due to their high differences. Specifically, the relationship between relatives is more trusted and paid back than non-relative relations despite the differences among relatives since such relations involve moral subsystems. Similarly, Rossi (2007) proposes that family relations are a primary social capital that leads to other networks. Coleman perceives that social capital in a family is tied with commitments and relations between parents and children. (Coleman, 1988, as cited in Lichter, Cornwell, & Eggebeen, 1995). In the study of Lichter, Cornwell, & Eggebeen (1995), social capital was measured by family structure by considering the pattern of members' co-living and size of a family. Besides, Coleman also gives importance to effective intimacy between parents and

children. For his perspective, intimacy is a type of social capital that can be considered from parents' knowledge about their children's friends and their friends' parents. (Coleman, 1988, as cited in Portes, 2000). Portes (2000) studied social capital based on this concept by measuring the level of intimacy from the numbers of parents of their children's friends who they know.

Thailand is also aware of the importance of social capital. For example, Suwannee Khamman (2008) proposes the crucial fundamental characteristics of Thai people: being moral and ethical in adopting knowledge for use, having public-mind value, being fond of reading and working, being disciplined, expressing a collaboration, and being responsible for the society. A person with such characteristics or qualifications must be cultivated since he or she grows in a womb. A couple must have knowledge and skills in nurturing their child to be born with quality, and in bringing him or her up towards appropriate development by his or her age. The development of social capital in the groups of adolescents requires the creation of values of assurance, trust, caring, sharing, and collaboration.

Bang-on Thepthie, Parinda Tasee, Piyachatr Tragoolvongse, and Supattra Inpaiboon (2008) studied social capital and strong families based on the concept that social capital is a matter of a family's consciousness towards the whole society that can empower a community while a family has to develop interdependence with its community. Therefore, a family plays a role in supporting a society righteously and then the society or community can help the family to be strengthened as well. The measurement of social capital in this study involves support from family members regarding the maintenance of the public property, participation in art and cultural activities, including a community's rituals and their membership in other groups of society.

Piriya Pholphirul and Pungpond Rukumnuaykit (2008) studied a research entitled, "Happiness from Social Capital," and define the term of social capital at both individual and community level as "to know someone in a society very well, to sacrifice one's time and labor in helping a society fully, to have trust to lend something to someone, to have no worries about danger or unsafety in a community, to participate in expressing an idea, to find no crimes in a society in one month, and to join activities that are useful for the public."

Concerning the measurement of social capital, Healy and Cote (2001) suggest that the measurement must cover the main dimensions of society, namely networks, values, and norms. Besides, it includes a balance between attitude and behaviors and it must concern about the cultural dimension as well. Social capital can be constructed by a family and other units in a society, i.e. schools, communities, offices, etc. However, it should be constructed on the foundation at which norms, social engagement, and social networks that are beneficial for members are created by a family. Social capital should come from family relations of all concerned parties and be able to respond to the emotional and physical needs of children. Besides, it should enhance the development of trust and collaborative behaviors. Moreover, materialistic and emotional support that can be freely shared among family members can enhance a willingness and expectation to pay back for those supports obtained within and outside a family.

For this study, it focuses on the creation of social capital in adolescents' family based on the concept that a family is the primary source of human capital accumulation through parents' investment to create networks, trust, reciprocal compensation, and decent norms that are beneficial for a child or children. This creation can start from good relations among family members and extend to networks outside the family. In reviewing indicators of family relations and social capital in Thailand, it is found that the Office of Women's Affairs and Family Development, the Ministry of Social Development and Human Security cooperated with the Faculty of Health Sciences, Mahidol University (the Office of Women's Affairs and Family Development and the Faculty of Health Sciences, Mahidol University, 2009) in organizing indicators for measuring strong families or family strength in four dimensions: family relations, self-reliance of a family, social capital, and a family's adaptation. In this study, only the indicators of family relations and social capital are applied. The indicators of family relations of a strong family are related to family members' determination in creating and maintaining their family's co-living, love, mutual engagement, expression of meanings, praises, listening, co-activities, caring, and consistent nurturance. For social capital, it means a family's trust, feeling safe, and pride in being a part of a community or a society.

2.1.7 The Concept of Digital Divide

ICT, including new technology, is perceived as an important mechanism in developing economics, society, politics, education, etc.; on the other hand, technologies have been developed very widely and rapidly, i.e. large-sized mobile phones became smaller portable ones with a capacity in responding to users' various kinds of activities, i.e. searching for information via internet, sending e-mail, using social media, and playing games online. However, no matter at which level, i.e. international, national, and interpersonal level, to compare the use of technologies among users, an inequality of accessing and using ICT including communication technologies is found. This phenomenon is called, "Digital Divide," which has been introduced since the end of the 1990s. (Van Dijk, 2005). At the international level, a digital divide is found between developed and underdeveloped countries (Kim & Kim, 2001). In the United States of American, such inequality is found between white and black people. In Thailand, it is probably found between urban and rural areas, and between people of different socio-economic status. (Soraj Hongladarom & Achara Entz, 2004). Furthermore, National Electronics and Computer Technology or NECTEC (2001) defines the digital divide as the gulf between those who have ready access to computers and the Internet, and those who do not, among various groups of population in a world society. The keywords are the accessibility and information and knowledge acknowledgment. The digital divide can be called under other names, such as the digital gap, inequality in accessing information and knowledge.

The studies on the digital divide have not been restricted in the academic circle, but also in politics as well. (Broos & Roe, 2006)/ During the first stage of digital technological development, the inequality focused on accessibility and was called the Digital Divide Stage 1, which focused on two groups of population: those who have and those who do not have digital technologies. For the Digital Divide Stage 2, it emphasizes the use of those who can access to digital technologies. Since nowadays, the appearance of technologies is pervasive increasingly; thus, more studies aim to the Digital Divide Stage 2. (Cheong, 2007; Zhao, 2009).

Concerning the Digital Divide Stage 1 or an inequality of accessibility to digital technologies, Van Dijk (2005) classifies the access to digital technologies into four types: A) Mental access means a lack of experiences in basic ICT due to a lack of

interest or a feeling that new technologies are not interesting, and an anxiety about the use of a computer. This kind of accessibility problem is often ignored as it is perceived as a temporary problem and as a problem of specific groups, i.e. the elderly, uneducated, or housewives. B) Material access means no possession of a computer and a connection to the internet. This gap is often concerned due to the belief that if this gap is fulfilled, the problem will be resolved. C) Skill access means a lack of ICT skills due to insufficient education and a lack of social support. This gap occurs because too much attention is paid to working skills and the ability to use programs. It includes information processing and searching strategies from computers or networks, and its application towards one's social status promotion. D) Usage access means a lack of opportunities for using technologies.

Hargittai, DiMaggio, Celeste, and Shafer (2004, as cited in Cheong, 2007; and Zhao, 2009) extend the concept of the digital divide by covering other kinds of inequality, such as equipment, the autonomy of use, skills of internet usage, searching competency, support, goals, and usage patterns. All of these inequalities bring about unequal opportunities to make use of ICT. Zhao (2009) raises an example of the Digital Divide Stage 2 that points to social inequality. Specifically, although American adolescents can access the internet, some of them cannot use at home or some can use but with low-speed internet. Besides, the social media they access is also different.

Similarly, Kim and Kim (2001) also categorize the digital divide into three levels: A) the level of media accessibility, influenced mainly by economic status. B) the level of information mobilization, which combines all activities involving the use of information processing, i.e. the use of a device, the familiarity with the programs, and the competency in searching for information. Therefore, the length of time spent on the internet is not an indicator of the digital divide at this level because the time used for playing games or chats online is not considered useful. Still, these two levels of digital divide related to the expansion of a person's opportunities in life. C) The level of information awareness or consciousness means a user's ability to decide if the received information is good or not and to use if for intellectual and cultural benefits. It leads to a better quality of life. However, the digital divide at this level is not so interesting to be studied in spite of its involvement with a user’s competency. Besides,

Kim and Kim (2001) point out that the issue of the digital divide has shifted its focus from the possession of technologies to a user's autonomous reception.

At present, there have been studies on the Digital Divide Stage 3, which means the unequal outcome from the use of the internet of those who can access to ICT unlimitedly with similar usage patterns. The digital divide at this level is based on the assumption that there are some gaps in offline outcomes that users can access and create. This research thus aims to study who can be a beneficiary of the outcomes from the use of ICT, including communication technology. (Van Deursen & Helsper, 2015) It may be said that the functioning of a family, a part of this study, is a part of the Digital Divide in the third period.

The factors affecting the digital divide can be classified into five groups:

1) Information infrastructure, e.g. an opportunity to use electricity, basic phone and mobile phone, the diffusion of computer use, the use of the internet and satellite (NECTEC, 2001; Scott, 2006) and internet zone (Kim & Kim, 2001)

2) Demographic factors, e.g. sex, age, race, family structure, income, education level, language used (Van Dijk, 2005; NECTEC, 2001; Scott, 2006) occupation, social status (Kim & Kim, 2001).

3) Governmental Policies, e.g. IT liberalization policy, tax policy, etc. (NECTEC, 2001; Scott, 2006)

4) Business factors, i.e. size or an organization, type of business, location of an organization (NECTEC, 2001)

5) Psychological factors, i.e. attitudes towards ICT, motivation towards the use of ICT, self-efficacy in using ICT (Broos & Roe, 2006)

For Thailand, internet networking was developed firstly in the mid of 1987 where Thailand had not been equipped with necessary and fundamental equipment for establishing computer networks. Besides, the diffusion of telephones was also low, with people's low knowledge of technologies and high prices of a computer. Still, due to the dedication and vision of a group of university instructors, the internet in Thailand has been developed and diffused widely up to present. (Sirin Palasri, Huter, & Wenzel, 1999). From the academic circle, it has been expanded into a commercial or business circle since 1995. (Sakulrat Montreevat, 2002). Finally, it has expanded into families and homes.

The concept of the Digital Divide indicates that the digital divide can be at different levels. Accordingly, an emphasis on the study on the possession of technologies is thus insufficient. Besides, family functioning, which is influenced by the use of technologies, depends also on the level of the digital divide in the first and second periods.

2.2 Conceptual Framework

To develop a conceptual framework for studying families' adoption of new technology and factors affecting the functioning of adolescents' families in Bangkok, several concepts and theories from various disciplines are used. Functionalist or Structural Functionalism is used to study if and how ICT, especially new technology, influences families' functioning while media ecology and new media theories are used to explore the effect or impact of new technology on individuals' and families' behaviors, especially when families adopt new technology as part of their house and the possession of new technology might affect families' functioning. Besides, the concept of the digital divide does not only cover the issue of technology possession but only concerns about adolescents' use of technology. Furthermore, as adolescents' families might use ICT, including new technology, differently, it might affect families' functioning differently as well. On the other hand, the characteristics of a family that influences the level of social, cultural, economic, and physical resources of the family can have different influences on families too. Since families' functioning is the main phenomenon to be studied in this research, the related concepts like the concept of the creation of human and social capital of families are focused. Besides, to understand families' adoption of new technology, the concept of domestication of media and technology and family systems theory is also applied in the conceptual framework of this study as illustrated in Diagram 2.1, including other variables expected to be relevant to the families' functioning.

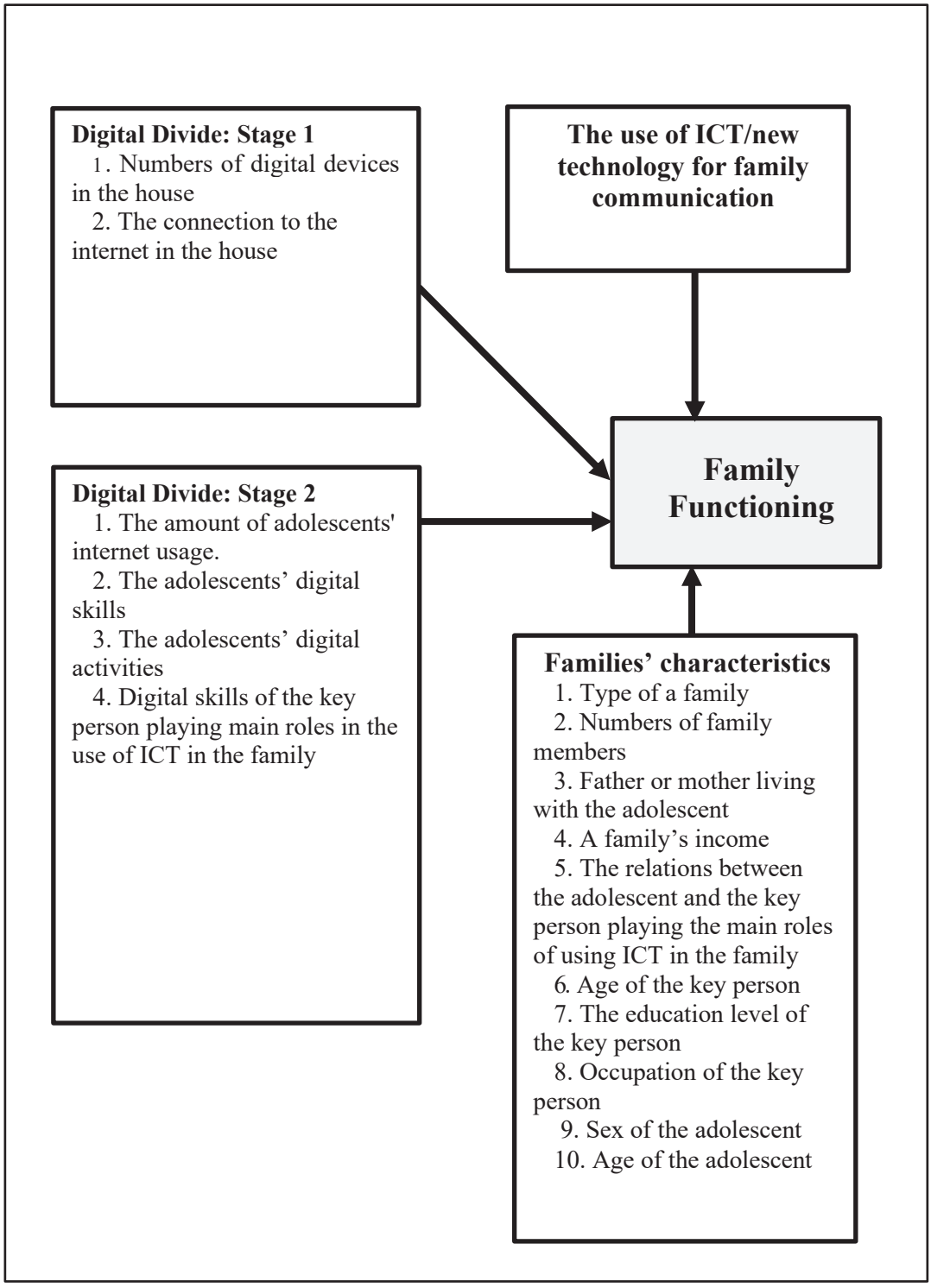

Figure 2.1 Conceptual framework of the study

2.3 Related Studies

In this part, the findings of the previous studies related to this research are presented and used as the foundation for formulating research hypotheses to investigate the causal relationship between independent variables and the adolescents' family functioning.

2.3.1 Digital Divide: Stage 1

A digital divide appears at different levels. For the digital divide: Stage 1, the focus is on the possession of the ICT, including new technologies in the house. For this part, it comprises two independent variables expected to have a relationship with family functioning as follows.

2.3.1.1 The numbers of digital devices in the house.

From the previous studies, it was found at the statistical significance level of 0.05 that the more numbers of digital devices, including new technologies, devices the houses possessed, the more opportunities they would use them. (Issara Tiyasuksawat, 2009) Thus, families could not perform their functions effectively. On the other hand, Kennedy, Smith, Wells, and Wellman (2008) found not families equipped with several communication devices had fewer chances to have dinner with their family members, and thus caused dissatisfaction with their family life and their leisure time, including causing unclear separation between work and home atmosphere. Besides, Mesch (2006) found that families possessed some and no ICT devices in the house had different family dynamics because of their families' acceptance of ICT in the house. Accordingly, the researcher expects that family functioning has an inverse or negative relationship with the numbers of digital devices at home.

2.3.1.2 The connection to the internet

Technology space in the house provides an opportunity for families to use technologies for doing some activities. Especially, the connection to the internet facilitates the use of new media. For instance, if ICT devices are installed in a private room, e.g. a bedroom of each family member, it will lead each of them to spend his or her time in the personal room and cause a lack of interaction among family members, which lessens the opportunities for families' functioning. When children become

adults, the time for spending with families is thus lessened as well, but with the media, especially in their bedroom, is increased. (Jennings & Wartella, 2004; Wartella & Jennings, 2001). This also changes the family relations towards more individualism orientation. Livingstone (2006) calls this phenomenon as "living together separately." On the other hand, if the connection to the internet is wireless, it means that all family members can link to the internet at any place or any time. Consequently, family members have more time with media so it makes families perform their functions harder. From the survey of household uses of information and communication technologies in 2018, it is found that houses connected to the wireless internet in Bangkok, 65.4% of them had a connection to the internet (National Statistical Office, 2018). The researcher thus expects family functioning has an inverse or negative relationship with the connection to the internet at home.

2.3.2 Digital Divide: Stage 2

The digital divide: Stage 2 involves the issues of the use of digital devices, digital skills, and digital activities of the family members as follows:

2.3.2.1 The amount of adolescents' usage of the internet.

Besides the possession of ICT, the concerned issue in the digital divide: Stage 2 focuses also on the use of ICT. At present, society gives high importance to the effect of the use of ICT on family functioning. Specifically, if family members have a high degree of using ICT, the time they can give to one another is less. Besides, the roles of families in teaching and cultivating their children are less important. Accordingly, the higher amount of adolescents' use of ICT should make the quality of their family lives worse. For example, in the study of Mitchell, Finkelhor, and Wolak (2005), it was found that parents often used screening and blocking software against improper websites when they distrusted their children on using the internet responsibly. Similarly, Mesch (2006) found that the adolescents' frequency of using the internet correlated with the decrease in families' cohesion. Therefore, the researcher expects that family functioning has an inverse or negative relationship with the amount of adolescents' use of the internet.

2.3.2.2 The adolescents' digital skills

Digital Natives means children and youth born with digital technology and living among ICT devices, which enables them to have high skills in ICT and digital technologies. (Prensky, 2001, as cited in Nisara Sriployrung and Parichart Sthapitanonda, 2017). Although adolescents, in general, are counted as digital natives, their digital skills are unequal. This is because the more digital skills they have, the more they use ICT and thus they expose themselves to the danger risks on the internet increasingly. (Livingstone, 2006). This is because the more they use digital devices, the less time they have for activities with their families; thus, this may cause them more difficulties in performing their family role as expected by the society. Besides, it makes their exposure on the internet riskier (Livingstone, 2006) since it might be difficult for their families to do their functions as expected by the society due to the decreased time of their joint activities caused by the increased use of the ICT. This study thus expects that family functioning correlates inversely with the adolescents' digital skills.

2.3.2.3 The adolescents' digital activities

Digital activities are plenty: entertainment, education, knowledge inquiry, information processing, and communication. From the study of Mesch (2006), it was found that the adolescents' internet use for social purposes, i.e. playing online games, communicating with friends, and chatting, was positively correlated with conflicts in the families. However, the internet use for learning and information inquiry was not found to be correlated with conflicts, families' co-activities, and families' harmony. Accordingly, this research does not investigate the relationship between each type of ICT or digital activities and family functioning but the digital activities as a whole based on the assumption that if adolescents do a high number of digital activities, it will cause negative effect on families' functioning. Thus, it is hypothesized that family functioning has an inverse or negative relationship with adolescents' digital activities.

2.3.2.4 Digital skills of the key person playing main roles in the use of digital devices at home.

Eklund and Bergmark (2009) found that adolescents' parents with high experience in using the internet controlled their children's use of the internet than those with less experience. Carnegie Mellon University (2009) also found that the high use

of the internet caused the decreased size of social networks, less family communication, and social support, including increasing a feeling of loneliness. On the other hand, in the study of Kennedy, Smith, Wells, and Wellman (2008), it was found that mobile phones helped parents to contact their family members more easily, especially their children at home. Some people can use the internet for connecting one another, sharing experience and entertainment found on the internet. This brings good things to the families' life. The researcher expects that if parents have high digital skills, they can have more opportunities to do digital activities with their children, to teach or to advise them about how to use the internet, and to follow the family members' use of the digital devices, which is beneficial for family functioning. Thus, it is hypothesized that family functioning has a positive relationship with the digital skills of the key person playing main roles in controlling the family's use of ICT or digital devices.

2.3.3 The use of ICT for family communication

Family communication involves the exchange of information, opinions, attitudes, and the establishment of common understanding among family members, which is the mechanism of performing functions by roles. Family communication can be communicated through interpersonal communication, both face-to-face and mediated, i.e. telephone. At present, family members can use ICT as the channel for family communication, which can reduce both time and distance obstacles, and respond to the goals and motivations of families' functioning. To illustrate this, Uses and Gratification Theory emphasizes the role of an individual as an active receiver who can choose to expose to or use any media that responds to his or her needs and gratification. Korakot Sanjit (2019) found that social media could enhance the effectiveness of families' functioning in teaching, expressing their feeling and needs to be acknowledged by family members, showing love and engagement, and making decisions together. Therefore, when family members use ICT highly for family communication, the quality of families' functioning should be better. Accordingly, the researcher expects that family functioning has a positive relationship with the use of ICT for family communication.

2.3.4 Family Characteristics

2.3.4.1 Types of families

A family composes of both a kinship unit (Weeks, 2005) and consumption or economic unit. (Wall, Robin, and Laslett as cited in Weeks, 2005) A family can be considered as the most powerful kinship and consumption unit of society since family members living in the same family have shared responsibility in allocating and sharing products and services for common uses of the family members. (Weeks, 2005). From the study of Livingstone in 2002 (as cited in Livingstone, 2007), ICT played a great role at home and how a family functioned depended on characteristics or components of the family. Family can be divided into a single or nuclear family and an extended family. An extended family comprises many other family members, e.g. grandparents, aunts, uncles, etc., who play a part in family functioning, i.e. to teach adolescents in the house to be human and social capital. (Kilburn & Karoly, 2008). It thus generally believes that adolescents living in an extended family grow up from a better family functioning than those in a nuclear family. However, Panpimol Lotrakul and Janchanok Yotinchatchawan (1999) found that extended families gained lower scores of family functioning than nuclear families at 0.05 statistically significance level. Still, the researcher expects that family functioning is correlated with the type of family.

2.3.4.2 The number of family members

Each family member has his or her roles, interaction, and responsibility for one another. Adolescents living with several family members under the social structure that influences the creation of different levels of resources for the family should have more chances to learn and develop themselves from their interaction, roles, and responsibilities assigned within the family. Besides, each family member plays a role in strengthening the ties of the family, giving warmth, and supporting other members. Therefore, large-size families should have better family functioning than those of small sizes. The researcher thus expects that family functioning correlates with the number of family members in the house.

2.3.4.3 Having fathers or mothers live together with adolescents

Adolescents may live with or without either their fathers or mothers in the same house because of their parents' jobs, divorce, or death. It is generally accepted

that good family functioning and family happiness should come from having parents live together with their children since parents play a great role in being a prototype for the physical, psychological, social, and personality development of their children. To have both the father and mother live with children will lead to better family functioning, especially in nurturing their children and doing activities together than families having only the father or mother. (Bryant, 1992). Correspondingly, families having both fathers and mothers should be able to perform their family functioning better than those having either of them. Nevertheless, for this research, the researcher expects that family functioning correlates with the person with whom adolescents live.

2.3.4.4 Family income

All investments on children's education and related products and services, e.g. food, books, tourism activities, computer, the internet, etc. rely mainly on family income. Consequently, family economic status relates with the roles of ICT in the house and the family life (Livingstone, 2006), Pierce (2009) found that families with higher income reported having less time for their families due to their family members' high amount of the internet use. On the contrary, Panpimol Lotrakul and Janchanok Yotinchatchawan (1999) found that families with higher economic status could perform their family functioning better than those with lower economic status. Hence, the researcher expects that family functioning correlates positively with family income.

2.3.4.5 The relationship with the key person playing main roles in the use of ICT in the family

The father and mother of an adolescent is a part of social output restricted by social or cultural condition to play a role of male and female respectively, including sex roles that affect male and female status in such a society. Passorn Limanon (2001) found that fatherhood and motherhood in the role of nurturing the children might affect family functioning since in general females tended to have fewer ICT skills than males. Furthermore, Eklund and Bergmark (2009) found that adolescents' mothers controlled their children's media use more than fathers at 0.05 statistical significance level. Thus, children tended to report that their mothers were stricter than fathers as they stayed home more than fathers. Therefore, most of the family rules are a part of a mother's roles. (Livingstone, 2007). Oppositely, Wang,

Bianchi, and Raley (2005) found that fathers followed their children's use of the internet more than mothers.

For family functioning in general, mostly mothers play a principal role in nurturing children since women are more patient and own more skills and tenderness in taking care of the children; therefore, women can perform this role better than men. Pierce (2009) found that women often reported having less time for families because of their children's use of the internet and this reflected the women's delicacy. Therefore, the families in which the key person controlling the use of ICT in the house is the mother should perform their family functioning better. The researcher thus expects that family functioning correlates with the key person who controls the use of ICT in the family.

2.3.4.6 Age or generation of the key person playing main roles in the use of ICT in the family

Age or generation is a fundamental demographic attribute of the population, which reflects the differences in life experiences, and political, economic, social, and technological environment of people born in different years or of different ages. Such differences cause different values, beliefs, and ways of life in many dimensions, i.e. human resource management, training, and development, etc. The differences in each range of ages are called, "generation." (Salopek, 2000). Each family comprises different generations of the population; therefore, they possess different personalities and unequal skills in computers and the internet and this induces a generation gap. The incongruence of opinions among family members may affect the family relationship. (Livingstone, 2006) Newman and Grauerholz (2002) mentioned about American society that baby boomers gave importance to independence, married and had children late. On the contrary, later they gave importance to family relations as the source of people's success in life, while people born between 1979 to 1994 gave importance to the family traditional missions increasingly. Wang, Bianchi, and Raley (2005) found that parents with younger ages tended to follow their children's use of the internet more than those with older ages. However, parents with older ages had more human and social capital than those with younger ages; thus, they could perform their family functioning better than those with younger ages. For this research, the researcher

expects that family functioning has a positive correlation with the age of the key person controlling the use of ICT in the family.

2.3.4.7 Education level of the key person playing main roles in the use of ICT in the family

Education of parents is another human capital that can be transferred or inherited to their children to create their human and social capital. Writght, Cullen, & Miller (2001) found that parents with higher education levels could transfer their social capital to their children more than those with lower education levels. Panpimol Lotrakul and Janchanok Yotinchatchawan (1999) found that families with an education level of higher than a bachelor's degree could function their families better than those of lower level at the 0.05 statistical significance level. Therefore, adolescents whose fathers or mothers earn a higher education degree should perform better family functioning. Thus, the researcher expects that family functioning correlates with the education level of the key person playing main roles in controlling the use of ICT in the family.

2.3.4.8 The occupation of the key person playing main roles in the use of ICT in the family

Parents' occupation reflects their opportunities for the investment for their children, i.e. finance, time, purchase of ICT, and ICT skills, which affects their family functioning as well. On the other hand, it was also found that parents spending much time on their work had less time for their children. (Othman, Yusof, & Osman, 2009). The occupations here cover a wide range, i.e. directors or managers, professionals, entrepreneurs, government or private workers, hireling, and unemployed. Each occupation provides unequal financial stability and opportunities for living with their families. Livingstone (2007) found that parents with better economic status often set rules about their children's behaviors and activities outside and their viewing of television and video more than parents with lower status. Unemployed parents may have more time for their children while parents in the hireling area and having lower economic status may have uncertain time for their work and also for the time with their children; thus, their family functioning may be performed less. From one study on the nurses and their family functioning in Taiwan, it was found that married nurses who had work shifts, including working at night every day, had poorer family functioning

than those who worked less at night (Tai, et at.2014). Therefore, the researcher expects that family functioning correlates with the occupation of the key person controlling the use of ICT in the house.

2.3.4.9 Sex of the adolescents

In English, there are two similar words, "sex and gender." These two words contain different meanings. In that, the same word “phed" is used to mean both. "Sex" is naturally innate and is the biological aspect of an individual determined by the anatomy that is unchangeable or assigned at birth to be male or female. They are assumed to play the role of producing an heir and both of them possess different personalities. "Gender" is an individual's aspect determined by a society or culture to play a male or female role. Although such determination is based on an individual's biological differences, gender is a deeply held internal sense of self and is typically self-identified learned from different sources since birth until it is embedded. Sex roles thus are different in each society and culture and involve an opportunity in life to which each sex can access differently due to different rights, power, responsibilities, and expectation determined by society (Passorn Limanon, 2001). Consequently, adolescents of different sex should have freedom in doing any activity perceived by their parents as appropriate for their sex differently.

Sex plays a role in the use of ICT and family functioning (Livingstone, 2006, as cited in Livingstone, 2007; Jennings & Wartella, 2004). Livingstone (2006) found that in the United Kingdom, male adolescents used the internet, had the internet skills, and faced internet dangers more than females as the nature of activities that male and female adolescents participated was different. Therefore, this led families to control, frame and set rules for their children of different sexes differently. Furthermore, Eklund and Bergmark (2009) found that male adolescents in Sweden were controlled by using media, i.e. games, computers, internet, differently from females at 0.05 statistical significance level. More uses of male adolescents should have an effect on less time with their families than females and might cause more arguments with their parents about the rules of using ICT in the family. Correspondingly, the research expects that the family functioning correlates with the sex of the adolescents.

2.3.4.10 Age of the adolescents

"Age" is not only a number but is a fundamental characteristic of populations that reflects an individual's maturity and life experiences. Even for adolescents, the range of their ages plays some significant roles. Livingstone (2006, as cited in Livingstone 2007) found that age was related to the roles of ICT in the house and the adolescents' family life. Since adolescents with upper ages are more mature due to their physical, psychological, and social development, parents are more worried about their children of lower ages than upper ages. (Jennings & Wartella, 2004). This finding accords with several studies, such as the study of Eklund and Bergmark (2009), which found that adolescents of lower ages in Sweden were more controlled of using media at 0.05 statistical significance level, the study of Mitchell, Finkelhor, & Wolak (2005), which found the parents' use of screening and blocking software of inappropriate websites for children of lower ages, and the study of Wang, Bianchi, & Raley (2005), which found that parents followed the use of the internet of their children of lower age. Besides, Livingstone (2007, 2006) further found that the rules for controlling the use of media were diminished when their children were more grown-up. However, the arguments or conflicts between parents and children remained, in terms of finance, responsibility, and freedom, rather than the use of media. On the contrary, adolescents with upper ages might also have been more invested by their families in terms of the higher amount of their accumulated time with their families and other family investments. Accordingly, the researcher expects that the family functioning correlates with the adolescents' ages.

2.4 Research Hypotheses

From the theoretical concepts and previous studies, variables under the concept of the digital divide, the usage of ICT for family communication, and family characteristics are found to correlate with family functioning. Thus, this research formulates the following hypotheses:

2.4.1 Digital divide correlates with family functioning:

2.4.1.1 Family functioning and the number of ICT or digital devices at home are negatively or inversely correlated.

2.4.1.2 Family functioning and the connection to the internet at home are negatively or inversely correlated.

2.4.1.3 Family functioning and the amount of adolescents' usage of the internet are negatively or inversely correlated.

2.4.1.4 Family functioning and adolescents' digital skills are negatively or inversely correlated.

2.4.1.5 Family functioning and adolescents' digital activities are negatively or inversely correlated.

2.4.1.6 Family functioning and digital skills of the key person playing main roles in the use of ICT in the family are positively correlated.

2.4.2 The use of ICT for family communication correlates with family functioning:

Family functioning and the use of ICT for family communication are positively correlated.

2.4.3 Family characteristics correlate with family functioning:

2.4.3.1 Family functioning and the type of family are positively correlated.

2.4.3.2 Family functioning and the number of family members are positively correlated.

2.4.3.3 Family functioning and to have the mother or/and father live with the adolescent are positively correlated.

2.4.3.4 Family functioning and family income are positively correlated.

2.4.3.5 Family functioning and who is the key person playing main roles in the use of ICT in the family are positively correlated.

2.4.3.6 Family functioning and the age of the key person playing main roles in the use of ICT in the family are positively correlated.

2.4.3.7 Family functioning and the education level of the key person playing main roles in the use of ICT in the family are positively correlated.

2.4.3.8 Family functioning and the occupation of the key person playing main roles in the use of ICT in the family are positively correlated.

2.4.3.9 Family functioning and the adolescent's sex are positively correlated.

2.4.3.10 Family functioning and the adolescent's age are negatively correlated.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Research Methods

This research is non-experimental and use both qualitative and quantitative methods. For qualitative research, the data was collected with a phenomenon-based approach by an in-depth interview with adolescents and either their father or mother in 2017 to study how the process of communication technology, as a part of ICT, is integral in a family system, so a family is a unit of analysis. Subsequently, the results from the qualitative research were used for explaining the data collected from quantitative research, in which an adolescent is a unit of analysis. The quantitative research was conducted by a survey questionnaire with adolescents in 2018, to explore the digital divide situation and the family functioning in Thai society, including examining the factors affecting the functioning of families.

3.2 Population and Samples

3.2.1 Qualitative Research

3.2.1.1 Key informants

They were families with at least one teen family member and a father or a mother, possibly including other people living with a family, in Bangkok.

3.2.1.2 Number of key informants and accessibility

Twelve families were interviewed. Each family comprised one adolescent and either a father or mother of the adolescent. They were approached and asked for cooperation through friends and family networks. The following criteria were determined in selecting the families:

1) The adolescents had to be a student at the secondary education level, both lower and upper, in a formal-system school, to obtain information from the informants of different ages.

2) They had to comprise both male and female adolescents

3) Either the father or the mother lived in the same familywith the selected adolescent.

3.2.2 Quantitative Research

3.2.2.1 The population and samples

The population was adolescents studying in the secondary-education schools in the formal education system in Bangkok in 2018.

3.2.2.2 The sample size and sampling

The samples were adolescents studying in the secondary-education schools in the formal education system in Bangkok with the sample size based on the assumption of obtaining sufficient numbers of samples for analysis with different demographic variables, by additional consideration on the emittance of the incomplete questionnaires, within the restricted time and budgets. The samples for a data collection were 800 adolescents or students.

The sampling procedure comprised of three steps as follows:

Step 1: Determine the offices with which schools were affiliated and which were responsible for instruction at the secondary-education level, and four offices involving with instructional management for general subjects were selected: Office of the Basic Education Commission (OBEC), Office of the Higher Education Commission (OHEC), Office of the Private Education Commission (OPEC), and Bangkok Metropolitan Administration (BMA).

Step 2: Select one school in the Thai program, which was not international schools, from each affiliation. However, if it was inconvenient for any selected school for data collection, new schools were selected until getting schools of all affiliations. An additional school affiliated with the Office of Private Education Commission was selected because of insufficient numbers of samples. Consequently, there were altogether five schools as the samples for this study.

Step 3: Select one classroom of each level in each selected school. The total numbers of the students as the samples of this study at the primary stage were 947 students. The researcher was allowed to collect data from the students by the date and time designated by each school. However, after analyzed the demographic or personal information on the responded questionnaire, only 808 students were screened to be actual samples for the study. The criterion n for screening was to select students who lived with either their father or mother and one of them had to be the main family member who was responsible for taking care of ICT usage in a family. Table 3.1 presents the total numbers of the samples stratified by their school's affiliation.

Table 3.1 Exhibits the numbers of the samples stratified by their school's affiliation**.**

Affiliation	**Name of the school**	**Numbers of samples of the initial data collection**	**Numbers of the samples selected for data analysis**
Office of the Basic Education Commission (OBEC)	Bodindecha School 2	275	57
Office of the Higher Education Commission (OHEC)	Kasetsart University Laboratory school	221	118
Office of the Private Education Commission (OPEC)	Anwarulislam School	77	180
	Kasemphithaya School	139	242
Bangkok Metropolitan Administration (BMA)	Naluang School	235	211
Total	-	947	808

3.3 Research Instrument

3.3.1 Qualitative Research

The research instrument comprises unstructured interview form with questions developed from the concept of domestication of media and technology as a part of life of Silverstone (2006) and the concept of Ventakesh et al (2003) on the structural components of home or living space, namely social space, physical space, and technological space, and the center of the house, i.e. activity center, entertainment center, work center, shopping/financial center, family interaction center, information center, communication center, and learning center.

The interview questionnaires are divided into 2 sets: the first set for adolescents and the second set for either the father or mother of an adolescent, questioning on the possession and usage of ICT in a family, family communication, and family functioning.

3.3.2 Quantitative Research

The research instrument is a self-administered questionnaire for adolescents, which is divided into three parts:

1) General information: personal and demographic information of adolescents and their parents, including the possession of ICT in the house.

2) The usage of ICT of adolescents and other family members during the past six months before the data collection, including the questions on adolescents' digital skills, based on the research of Livingstone (2006) and activities using ICT, developed from the concept of Mesch (2006).

3) Family communication during the past six months before the data collection, covering the following issues:

(1) The questions on the family functioning, i.e. the creation of human capital of a family, which are developed from the concept of Schultz (1961); Becker (1993, as cited in Simmons, Braun, Wright, & Miller, 2007); Kellaghan, Sloane, Alvarez, and Bloom (1993, as cited in Healy & Cote, 2001); Healy and Cote (2001); and Chamratrithirong, Miller, Brynes, Rhucharoenpornpanich, Cupp, Rosati, and Todd (2013), and the family functioning on creating social capital, developed from the

concept of Bourdieu (1985, as cited in Healy & Cote, 2001); Coleman (1988, as cited in Lichter, Cornwell, & Eggebeen, 1995); Healy & Cote, 2001; and Rossi 2007. Besides, some questions are modified from the family-strength indicators of the Department of Women's Affairs and Family Development, the Ministry of Social Development and Human Security, and the Faculty of Health Science, Mahidol University, 2009.

(2) The questions on ICT usage for family communication are developed from the study of Korakot Sanjit (2017).

3.4 Data Collection

3.4.1 Data collection of qualitative research

As aforementioned, the researcher accessed the families of the samples through their relatives' network and asked for their cooperation. After their consent, the researcher contacted the families and explained the objectives, research questions, and interviewing processes, including making an appointment by their convenient date, time, and place. If possible, the researcher interviewed both the adolescents and their mother or father on the same day, but some families were interviewed for two times. The data collection was conducted from February to March 2017.

During the interview, the interview with all interviewees was recorded with prior permission and explanation. Every word from the interview was transcribed and printed for analysis.

3.4.2 Data collection of quantitative research

The data collection was permitted by the director of all schools of each affiliate, who were contacted by a formal letter for cooperation. Earlier, the researcher coordinated with guidance counselors or assigned teachers for collecting data by questionnaires from students in the classroom on the date and time designated by the schools. The researcher's team met students in the classroom and explained the details of the study. The questionnaires were distributed and were administered by students until all questionnaires were completed and collected within the given time frame. The

data collection of quantitative research was conducted in February, and then from June to July 2018.

3.4.3 The Protection of the Rights of Research Participants.

No matter in the data collection of the qualitative or quantitative research, it must be conducted voluntarily and the research participants can deny their participation in responding to questionnaires or in giving an interview without any effect on adolescents either their father or mother. In case, the respondents feel uncomfortable or uneasy to reply to any question, they can choose not to do so or can omit such questions. The data collected in the questionnaires are kept as confidential and no names or any information referring to the respondents or interviewees are disclosed.

3.5 Variables and the Measurement of Variables

The details of the dependent and independent variables, including questions in the research instrument, the operational definitions, and the measurement of the variables are displayed in Table 3.2

Table 3.2 Variables and the measurement of variables

Type of Variable	Name of the variables	Operational definition	Questions in the questionnaire	Choices or newly created groups	Scoring
Dependent variables					
	Family functioning	The total scores of interaction among family members by their roles and status towards happiness of the family during the past six months before the data collection. The higher total scores reflect the level of better or more quality family functioning.	Part 3 Question no 1 (consists of 15 sub-questions)	1) never 2) seldom (1-3 days/week) 3) almost every day/often (4-6 days/week) 4)every day/regularly	0 1 2 3

Table 3.2 (Continued)

Type of variable	Name of variable	Operational definition	Questions in the questionnaire	Choices or newly created group	Scoring
Independent variable					
1	Digital divide				
	1) numbers of ICT devices at home	The total quantity of digital devices at home (piece) per one family member	Part 1.3 Question no 19: Laptop, notebook, tablet, old-style mobile phone, SmartPhone(s), and home phone	0-	
		The total quantity of digital devices is divided by the numbers of family members. After that, they are classified into four groups: no more than 1 piece, no more than 2 pieces, no more than 3 pieces, and 3 pieces up.			
	2) The connection to the internet at home	Connected or no connection to the internet at home	Part1.3 Question no. 20	1) no connection 2) have a connection	
	3) The amount of adolescents' internet usage	The numbers of hours adolescents use the internet per month during the past six months before the data collection.	Part 2, Question no. 1: the frequency of internet usage during the past six months	1) Every day 2) 5-6 days/ week 3) 1-4 days/ week 4) 1-3 days/ month 5) never	(7x4) = 28 (5.5x4) =22 (2.5x4) =10 2 0
			Question No 2: The numbers of internet usage per month during the past six months before the data collection.	1) more than six hours 2) 5 - 6 hours 3) 4- - 5 hours 4) 3- 4 hours 5) 2-3 hours 6) 1-2 hours 7) less than 1 hour to 1 hour 8) never	6.5 5.5 4.5 3.5 2.5 1.5 0.5 0
		Calculated by multiplying the answers to both questions. For example, if a respondent answers "every day" and "more than six hours up," the score will be 28×6.5=182 hours/week			

Table 3.2 (Continued)

Type of variable	Name of variable	Operational definition	Question in the questionnaire	Choices or new created group	Scoring
	4) Adolescents' digital skills	The total scores of adolescents' new-ICT usage ability	Part 2 Question no. 10 (consisting of 9 sub-questions)	1) cannot 2) can	0 1
	5) adolescents' digital activities	The total scores of adolescents' digital activities	Part 2 Question no. 9 (consisting of 10 sub-questions)	1) never 2) seldom 3) often 4) every day	0 1 2 3
	6) Digital skills of the persons mainly responsible for ICT usage in the family	The level of computer and internet usage ability of the persons mainly responsible for ICT usage in the family adolescents' point of view	Part 2 Question no.13 (for the father), or question no. 17 (for the mother), depending on who is the principal person in taking care of ICT usage in a family.	1) not good at all, or poor 2) moderate 3) good 4) very good	
	7) The usage of ICT for family communication	The total scores of the family's ICT usage for family communication during the past six months before the data collection.	Part 3 Question no. 6 (consisting of 15 sub-questions)	1) never 2) occasionally/ seldom (1-3 days/ week) 3) almost every day/ often (4-6 days/ week) 4) every day/ regularly	0 1 2 3
2	**Family characteristics**				
	1)Type of family	The aspects of the relationship among family members living regularly with the adolescent.	Part 1.1 Question no. 7	Nuclear family 2) extended family	

Table 3.2 (Continued)

Type of variable	Name of variable	Operational definition	The question in the questionnaire	Choices or new created group	Scoring
	2) The co-living of the father, mother, and the adolescent	The co-living of the father, mother, and adolescent in the same house.	Part 1.2 Question no. 10, 11, and 14	1) Both father and mother living with the adolescent. 2) Either father or mother living with the adolescent.	
	3) The number of family members	The number of family members, including the adolescent, living regularly in the same house.	Part 1.1 Question no. 6	2-	
	4) income of the family	The total average monthly income of all family members	Part 1.2 Question no. 17	1) less than 20,000 baht 2) 20,000-59,999 baht 3) 60,000-99,999 baht 4) 100,000 baht up	
	5) The relationship between the adolescent and the key person who plays the main role in controlling ICT usage at home	The relationship between the adolescent and the key person who is reported by the adolescent to play the main role in controlling ICT usage at home	Part 2 Question no.12	1) mother 2) father	
	6) Age of the key person who plays the main role in controlling ICT usage at home	The age (years) of the key person who is reported by the adolescent to play the main role in controlling ICT usage at home	Part 1.2 Question no. 11 or 14, depending on whether it is the father or mother who is reported by the adolescent to play the principal role of controlling ICT usage at home.	26-	

Table 3.2 (Continued)

Type of variable	Name of variable	Operational definition	The question in the questionnaire	Choices or new created group	Scoring
	7) The education level of the key person who plays the main role in controlling ICT usage at home	The highest level of education of the key person who is reported by the adolescent to play the main role in controlling ICT usage at home	Part 1.2 Question no. 12 or 15, depending on whether it is the father or mother who is reported by the adolescent to play the principal role of controlling ICT usage at home.	1) Lower than secondary education 2) secondary education 3) diploma/ a bachelor's degree 4) higher than a bachelor's degree	
	8) The occupation of the key person who plays the main role in controlling ICT usage at home	The main occupation of the key person who is reported by the adolescent to play the main role in controlling ICT usage at home	Part 1.2 Question no. 13 or 16, depending on whether it is the father or mother who is reported by the adolescent to play the principal role of controlling the ICT usage at home.	1) manager/ director 2) professional 3) temporary worker 4) commerce 5) government Officers/ private employees 6) no work/ unemployed	
	9) Sex of the adolescent	The biological sex of the adolescent	Part 1.1 Question no. 1	1) female 2) male	
	10) Age of the adolescent	The age (years) of the adolescent, counting from birthdate up to the most recent birthday.	Part 1.1 Question no. 2	11-	

3.6 Data Analysis

3.6.1 Qualitative research

The researcher analyzed the content from the interview to respond to the research questions and classified the findings into the key themes of the study. The findings or the presentation of information are supported by the direct quotation of the interviewees.

3.6.2 Quantitative Research

Descriptive and inferential statistics are applied as follows:

3.6.2.1 Descriptive statistics, i.e. frequencies, percentage, mean, standard deviation, and mode, are used for analyzing general characteristics of the samples, the possession, and usage of new technologies, family communication, and family functioning. New groups may be categorized and presented following the meaning of each group and frequency distribution.

3.6.2.2 Bivariate analyses by comparing the mean of variables to explore the relationship between each independent variable and the dependent variable.

3.6.2.3 Stepwise multiple regression analysis to study if and how each independent variable has an effect on the dependent variable at a statistically significant level when the effect of other independent variables is controlled. Besides, it helps to find which independent variable can explain the variation of the dependent variable the best at the 0.05 significance level.

Since the multiple regression analysis requires interval variables, the independent variables, which are nominal or ordinal, are modified to be dummy variables first. The groups need to be studied are chosen as a reference group with the set value at 0. Besides, before the multiple regression analysis, the linear relationship among independent variables is also tested to prevent the problem of multi-collinearity of independent variables or too high correlation (Patchayee Cheyjunya, 2015). Therefore, the criteria for choosing independent variables is the value of the correlation coefficient is not higher than 0.80 as advised by Ratherford and Choe (1993).

CHAPTER 4

THE ADOPTION PROCESS OF NEW TECHNOLOGY AS A PART OF A FAMILY

This chapter presents the findings on the adoption of new technology of the adolescents' families, collected from the qualitative research by interviewing a father or mother and a son or a daughter of 12 families in 2017, with a purpose of getting better understanding about the dynamism of the adoption process of new technology like ICT as a part of a family life based on the concept of Silverstone (2006) on the domestication of media and technology and the concept of Venkatesh, Kruse, and Shih (2003) on the structural components of "home" and the centeredness of activities, including the theory of family systems, which helps to provide an understanding on various dimensions of a family, starting from the family characteristics up to the adoption of new technology of the adolescents' families in Bangkok. The findings are as follow:

4.1 The Characteristics of the Families

All 12 families as samples of this study possess all stipulated conditions, namely, they are a family having a male or female adolescent who is studying at the formal secondary education level, both lower and upper, in 2017, and is living with either his or her father or mother in the same house. The details of each family are as follows:

Family 1 The interviewees are "Phol", the father aged 51 years old, and his daughter "Phool", aged 15 years old who is studying at grade 8 (lower secondary education). Besides, in the family, there are a mother aged 49 years old, a younger daughter, and a grandmother. This family is thus an extended family. Both father and mother graduated with a bachelor's degree and are university officers.

Family 2 The interviewees are “Chai”, the father aged 56 years old, and his daughter "Ee", aged 13 years old who is studying at grade 8 (lower secondary education). Besides, in the family, there are a mother aged 53 years old, and an elder daughter. The total number of the family is 4. This family is thus a nuclear family. Both father and mother graduated with a high vocational degree and run a bakery business.

Family 3 The interviewees are “Took”, the mother aged 47 years old, and her daughter "Ma", aged 16 years old who is studying at grade 10 (upper secondary education). Besides, in the family, there are a father, an elder daughter, and a nephew. The total number of the family is 5. This family is thus a nuclear family. Both father and mother graduated with lower secondary education and sell clothes.

Family 4 The interviewees are "Muay", the mother aged 40 years old, and her son "Few", aged 14 years old who is studying at grade 7 (lower secondary education). Besides, in the family, there are a father, and two younger daughters, living with another two sibling families. The total number of the family is 10. This family is thus a nuclear family. The mother graduated with a master's degree and does her own business at home while the father graduated with a bachelor's degree and is a private company employee.

Family 5 The interviewees are “So”, the mother aged 47 years old, and her daughter “Brave”, aged 16 years old who is studying at grade 12 (upper secondary education). Besides, Brave has another two stepsiblings. The total number of the family is 5. This family is thus a nuclear family. The mother graduated with a high vocational degree and run the food business while the father graduated with a master’s degree and has his law firm at home.

Family 6 The interviewees are “Lek”, the mother aged 51 years old, and her daughter “Sai”, aged 15 years old who is studying at grade 9 (lower secondary education. Sai is the only child in the family so the total number of the family is 3. This family is thus a nuclear family. The mother graduated with a bachelor’s degree and is a university staff while the father, aged 70 years old, graduated with a high vocational degree and is a freelancer.

Family 7 The interviewees are “Suwan”, the father aged 52 years old, and his daughter “Bam”, aged 16 years old who is studying at grade 10 (upper secondary education). Besides, in the family there are a mother aged 47 years old, a younger son,

and a grandmother. The total number of the family is 5. This family is thus an extended family. Both father and mother graduatedwith a bachelor's degree and are entrepreneurs.

Family 8 The interviewees are “Sarunya”, the mother aged 44 years old, and her daughter “Film”, aged 13 years old who is studying at grade 8 (lower secondary education). Besides, in the family there is a father aged 47 years old. The total number of the family is 3. This family is thus a nuclear family. The mother graduated with a vocational degree and is a merchant. while the father graduated with upper secondary education and is a policeman.

Family 9 The interviewees are "Kan", the father aged 47 years old, and his son "Good", aged 13 years old who is studying at grade 8 (lower secondary education). Besides, in the family, there are a mother aged 46 years old and a younger daughter. The total number of the family is 4. This family is thus a nuclear family. The father graduated with a master's degree and is an engineer while the mother is a doctor.

Family 10 The interviewees are “Rattana”, the mother aged 41 years old, and her daughter “Por”, aged 15 years old who is studying at grade 10 (higher secondary education). Besides, in the family, there is a sick grandfather. The mother who graduated with a bachelor’s degree and used to work in a private company but does not work anymore because she has to take care of her grandfather. The father graduated with a vocational degree and is an employee in a private company. Besides, many families have a total of sixteen family members so the family is an extended family.

Family 11 The interviewees are "Am", the mother aged 49 years old, and his son "Ink", aged 12 years old who is studying at grade 8 (lower secondary education). Besides, in the family, there are a father aged 49 years old and a younger son. The total number of the family is 4. This family is thus a nuclear family. The father graduated with a master's degree and is an entrepreneur while the mother graduated with a master's degree and is a researcher.

Family 12 The interviewees are "Ryla", the mother aged 36 years old, and her son "Navy", aged 16 years old who is studying at grade 10 (higher secondary education). Besides, in the family, there are a father aged 38 years old and two younger sons. The total number of the family is 5. This family is thus a nuclear family. The father graduated with a bachelor's degree and is an entrepreneur while the mother

graduated with a bachelor's degree but does not work as she has to take care of the youngest son.

4.2 The Adoption of New Technology of the Adolescents' Families

The adoption of new technology of a family means the steps of continual actions of an adolescent's family, starting from 1) appropriation: introducing new technology into the house, 2) objectification: adapting it to fit the spatial and temporal dimension of the family, 3) incorporation: using new technology in daily life to match the social and cultural environment towards maximal benefits for all family members, and 4) conversion or domestication, a two-way process in which the family shares the meaning of technology; on the other hand, culture and interactive pattern of the family might be affected. Thus, the family may or may not adopt or get used to it. (Mesch, 2006). For this study, the following is found:

4.2.1 Appropriation: Opening the door for new technology

Family and home are counterparts. In this study, families consist of those living in a single house, commercial building or townhouse, condominium, apartment, and flat. A house is a private living place and symbolizes family members' shared experiences and happiness. Despite no certain date of families' opening date for new technology, from the narration of family members, it helps to know that ICT, including new technology, has been bought and adopted in the house continuously by the advancement of technology in each period to respond to the family members' expected uses while there have been other existing media, i.e. television, etc. being equipped in the house. In this step, the following is also found:

1) Desktop computers are often first-adopted new technology in the house.

In this study, many families started to have a desktop computer, not necessarily connected to the internet, as their first ICT or new technology for their work and for doing business. When their children grew up and went to school, the computer was more necessary to be used for searching for information, doing a report, and

preparing a PowerPoint presentation, including printing works or sending emails. Thus, it was the time of moving ICT or new technology from the public sphere to the private space of the family.

> The desktop computer is for our youngest son. We have not bought any mobile phone because once he has a phone, he will not use the computer because it is more convenient and portable. (Family 3, mother)

> The first computer in the house I saw since birth is the one my dad uses for his work. (Family 6, daughter, grade 8)

> The computer is for business. I have been familiar since my childhood, probably when I was in grade 4. My younger brother knows how to use it better than I. Now, he got a new one and uses it to pay games only. (Family 7, daughter, grade 10)

> None uses it now because there's no signal. We used to have WiFi, but now it's not so good so we canceled it. When I have to work on a computer, I will go to the internet shop. (Family 12, son, grade 10)

> We all use our computer but he (the son) seizes it. I bought it when Good was grade 2-3. At first, my wife used it but when Good was in grade 4, he started to used it and in grade 5-6, he had to do his homework on a computer. It's necessary so I had to buy it for common purposes. When he's more grown-up, we may not use desktop but use a Notebook because of its convenience and WiFi. (Family 9, father)

2) Not only one, but two up.

It is not surprising to know that in a number of the adolescents' families, there are all kinds of ICT focused in this study: desktop computers, notebook computers, tablets, mobile phones, and the connection to the internet at home. Even for the houses with the least kinds of ICT or digital devices, they still own at least one

computer (either desktop or notebook) and personal mobile phones of each family member, especially when there is no internet connection in the house. Besides, the Smartphone(s) has several potentials, including its capability in using the internet on phone for information inquiry, communication, entertainment, and online games.

> We have five mobile phones, one notebook, and two tablets. The notebook computer belongs to dad, but we use the tablet together for playing games. Sometimes, mom also joins (for sharpening her brain) by her mobile phone. (Family 1, daughter, grade 10).

> We have four desktop computers that belong to my mom. For my uncle, aunt, and me, we use our notebook, so we have altogether 7 computers. For mobile phones, everybody has one of his or her own. (Family 4, son, grade 7).

> For my mom, dad, and I, we all have our own IPad, notebook computer, and mobile phones, so three of us have altogether 9 pieces. (Family 5, daughter, grade 12).

> My dad has two desktop computers for general uses. I also use them for viewing YouTube and playing games that someone posted. I will use the desktop computer of my father's company for working or in my dad's bedroom. We have no common space at home. (Family 10, daughter, grade 10).

3) The child's or children's education is the main motivation for adopting ICT in the house.

Since this research focuses on the families having an adolescent live in the same house and is studying at secondary education, it is found that the adolescents' family and school life are inseparable. The process of ICT adoption as a part of a family always involves the opportunities for their child's or children's full or maximal education or for enhancing the completion of their assignment, i.e. homework, reports, or enabling them towards their examination success. ICT is one major mechanism that parents are willing to invest fully in supplying the needed equipment or devices to

support their children's education and for their future investment. Since adolescents start their ICT skills from their school first and then from their home later by getting more advice from their family members.

> Notebooks are for working. Our children use them for their PowerPoint. They also help me when I get stuck. They use for their education only as we don't have the internet. (Family 1, father).

> I use the computer for typing my report only. (Family 2, daughter, grade 8)

> I started to learn computer from school when I was in grade 4. At first, they taught me how to type and then how to send an email or to send my assignment to my teachers. Then, I use it further.
> (Family 3, daughter, grade 8).

> All children have to use mobile phones because their school requires them to use. (Family 7, father).

4) Maximal use of mobile phones for parents' relief.

Since in a society, there are plenty of dangers: when children go to school, participate in any activity, or to travel to any place. Therefore, to have a portable mobile phone makes them convenient to contact their parents anywhere, i.e. to make an appointment of where to drop or pick them up, to share the photos of their activities or places they attend, to communicate with their family members, etc. Thus, this assures parents that they can know what is going on with their child or children and their children can contact them in an emergency.

Some adolescents owned a mobile phone since they studied elementary education. Mobile phones changed from push-button to touch-screen, and from ordinary to Smartphone(s). Adolescents used mobile phones since their childhood until they were accustomed to them and could use them skillfully. Mobile phones were given on special occasions, i.e. birthday presents, rewards for good deeds, e.g. good academic

achievement, or were bought by adolescents' savings or paid first by their parents and paid them back later.

> Both kids have their phones for calling to us in the evening. (Family 1, father)

> I will buy a new mobile phone for my child if I have a budget. Once she broke her phone, I told her to wait until she got a 4.0 GPA scale. She said I had to wait until next life. Now, her phone is very damaged so we cannot talk so well on the phone. (Family 6, mother).

> When both of them studied at the elementary school, they had no phone, but when they moved to grade 7, we agreed that if they could pass the exam, we would buy it for them. Thus, I bought an iPhone for the elder daughter and Smartphone(s) for the younger son. In the past, I used a push-button phone to show them to warn them not to be too lavish. However, later I could not catch up with them so they teased me. (Family 7, father).

> I have had a mobile phone since I was in grade 1. The driver of a public van forgot to drive me back home. At that time, I did not have a phone. After that, she bought one for me. Now I own 5-6 mobile phones. The latest one I bought it myself and the rest my parents bought for me. (Family 12, son, grade 10).

> My daughter had a mobile phone when she was in grade 4-5, but it was a push-button one. She changed to use a Smartphone(s) when she was at grade 7. (Family 3, mother)

> I told my sons if they wanted me, they had to do something for me first, that's a reward. Otherwise, they had to save their money and be responsible first. The youngest son was requested to be a monk first. The older son was a novice when he studied in grade 4. That's a reward. The rewarded telephone was a normal one. His grandmother gave it to him for letting us know that his classes were over. At grade 4, he was more responsible. Especially, after being a novice, he

> became more disciplined. At that time, if his grandma did not give him, he would listen to the principal monk. The old son wanted to have it so when he passed the ordination, we gave it to him. For the youngest son, he asked for a notebook computer, if he could do the same as his brother, we will do the same, but now he has not achieved his goal yet. (Family 11, mother).

4.2.2 Objectification: ICT room in the house.

When ICT entered the house, the next interesting step is to explore where ICT was placed in the house, and the following is found:

1) Each kind of ICT was placed in different places.

A few families did not have their ICT connected in the house due to network-signal problems so they did not install the connection. However, they could use the internet from the mobile phone packages that included the internet. Therefore, they could use their mobile phones in every room of the house. However, for other kinds of ICT including new technology, they were placed at different places. For instance, desktop computers were installed in the working room of the father or in the living room, which was the central space of the house. The children's notebook computers were in the bedroom. However, although the ICT devices were placed at different places, they had to adapt their usage by their convenience, such as no use of a notebook computer because of one's laziness to let it stand. The other example was to use a mobile phone to search for information or to play online games outside the house but use a desktop computer at home because of its bigger screen.

> Normally, I use a computer in the room at home but carry a portable mobile phone all the time. (Family 3, daughter, grade 8).

> On the mobile phone, I use Google, YouTube, Facebook, etc. for watching cartoons. At home, I watch the same on the computer because the screen is bigger. Too small screen causes eye pain. (Family 6, daughter, grade 8).

> Besides, a mobile phone, she uses a desktop. In her bedroom, there are no such ICT devices. She has only a mobile phone she can take into his room. I don't

want her to have too many devices to bring about more problems. However, when she was in grade 7, I let her be free." (Family 6, mother).

She uses it with her brother only so she does not need to use it personally. At home, we have a computer already. (Family 7, daughter, grade 10).
I have a mobile phone and IPad. For the notebook computer, it is often moved from place to place in my father's room. A computer is at my aunt's house nearby. I go there every day for typing my reports and my lectures. (Family 5, daughter, grade 12).

We have no personal space. When I use the computer, my parents can see who is doing what. (Family 8, daughter, grade 8).

2) Mobile phones were placed nearby.

A small portable device of various designs and colors called, "a mobile phone," becomes an indispensable part of life, that is always kept nearly no matter if it will be used or not. Mobile phones are all-purpose with lots of potentials on which users can use any applications and social media. On the other hand, they can also provide the personalness since they can be used to call and receive calls directly. Adolescents of several families told that they could not miss a mobile phone or they had to carry it near them all the time. Besides, when they had nothing to do, they would use mobile phones.

I can't study at all when a mobile phone is near me so I have to put it away during my exam. (Family 1, daughter, grade 10).

I use my mobile phone all day, but I use IPad at home because I'm too lazy to open line. When I go to school, I don't use IPad, but I use Line on my phone, Facebook, Twitter, Instagram, games, IPad, to do my homework and to watch movies. (Family 4, son, grade 7).

I use it everywhere. If I use long, I will use in a toilet. It is not because I don't want to be seen, but I want to bring it in as I'm very concentrated on something, no matter it is a mobile phone, games, cartoons, etc. If it is not like what I think, I will view it for another round. (Family 7, daughter, grade 10)

My mobile phone is next to me. I play games on the bed. (Family 11, the son, grade 8).

I have a mobile phone with me always. Sometimes, I sit near my parents using Facebook, Line, etc. They warn me to play less. I often hear this word, "play it less." For my younger brother, he is very addicted and often plays it in the room. When we sleep together, he still uses his mobile phone. (Family 12, son, grade 10).

3) The expansion of technological space from the house to families' cars.

This phenomenon appeared in the families whose house was far away from school. Parents and children had to take a car back and forth between the house and school together. Due to a long time during the distance and traffic jams in the morning and evening, families had a chance to spend time together exposing themselves to media. It is found that while children often spent their time on a mobile phone, fathers listened to the news on the radio and used this opportunity to teach their children based on their exposed news.

We go to school together and sit in the same car. At 7 o'clock, there's news, we sometimes talk about the news we hear and play games on the way back home. We listen to the radio while Nong and Noo play games." (Family 1, daughter, grade 10).

Mostly, we talk about our kid's studies, but we reach home, we separate and do whatever each wants to do." (Family 6, daughter, grade 8).

> We use mobile phones for contacting one another. Dad drives back and forth from home to school with a distance around over 100 kilometers. During the weekdays, when our daughter gets in a car, she often listens to music, watches cartoons, etc. If the internet signal is not strong, she will use her mobile phone to listen to music through earphones or watch cartoons. Another program she watches is a tourism guide by a man. I saw her watch it backward from TV programs. She uses it all the time, by playing it back and forth, while doing her homework. (Family 6, mother).

4.2.3 Incorporation: 24/7 with ICT

All families have 24 hours a day and seven days a week equally; however, parents and children in each family use technologies for their daily life differently with different purposes, including using different applications. In this study, it was found that some male adolescents played online games more than females while their parents also used social media quite a lot, especially Line. Smartphone(s) was the main device used by families. Besides, it was found that parents and children used ICT devices together, especially for entertainment, e.g. watching movies, viewing TV series backward, etc. The phenomenon found in this study reflects a different level of concentration in using ICT devices in the family until they become a part of their family life.

1) Everybody uses ICT

It is common to find that in a family, family members: parents and children, use ICT together, but with different purposes and applications. For instance, merchants use Line for contacting their customers, children use the internet for their studying, searching for information for their homework and reports or exams. For families, it was found that they used family Line to follow what's going on and share something interesting or useful. Parents used a group line of parents or the school's application for following their children's studying and assignments. Children used tablets for playing games. Mothers watched video backward on YouTube and social media. Accordingly, Smartphones are popular digital devices, which can be called the families nowadays as having "digital lifestyles" as shown in the following findings:

We, parents, use Line and Facebook for cooking and looking for orders (Family 2, father).

Occasionally, such as using social media or Line with my customers to receive orders. I don't use other devices so much. I also use Facebook but not so much. (Family 3, mother).

I use Notebook for my reports, Smartphone(s) for calling my parents in the evening and for playing games. Last year, I had my Notebook. My mother gave it to me because when I did my homework, I spent a long time so my mom gave it to me and she bought a new one for herself. I have been taught since I was in grade 4. However, now children are taught since they study in a kindergarten school, i.e. how to click, etc. so they know how to use it since their elementary education but they do not use it for doing reports, but for Google search. During the holidays, I play games. I miss my friends. I turn on the speaker. At home, we have speakers in all four stories. (Family 4, son, grade 7)

My mom seldom uses ICT. She has to sell her merchandise at her shop, but once she returns home, she will use it immediately. My dad uses a mobile phone all day. He's occupied with his work at the court. Now, his phone does not have 3G so he rarely uses it. He seldom uses a computer neither. My dad is addicted to Line while my mom likes to view YouTube. (video backward of Channel 3 and 7). She also lines to her friends. After she replies to her friends, she plays YouTube. I'm addicted to the mobile phone. Like my parents, when they know how to use it, they play all day. She uses another device to play on Line all the time as well, but I don't pay much attention to their addiction. (Family 5, daughter, grade 12).

Dad uses Mac because of his work. I use a Smartphone(s), but when I return home, I use Line with my niece to contact with my mother. I also use Facebook, but not relating to my work. I just open it to see my friends but I never give any feedback. I use Line for communicating with my friends and to contact my daughter. (Family 6, mother).

I use Notebook for everything: watching movies on YouTube, playing games, and working. I also play games on the phone. I mostly use a mobile phone at school and Notebook at home for listening to music, working, and playing on social media. When I wake up, I also check if my work is complete. (Family 9, son, grade 7).

I use ICT to watch the news and do shopping on the internet. My dad plays games while my mom works, so when he plays games, she does not like it and gets moody. Now, my dad focuses on agriculture because he bought some fields. Thus, now he does not play games, but pays attention to agricultural information instead. (Family 10, daughter, grade 10).

We have one computer belonging to my husband. What he does on it is his business files at work. He carries his notebook all the time. All of us have mobile phones, but I don't use it so much. I may check my phone every two days because I have a small child to take care of. I still check my Line while my husband uses Line for telephone or to show videos for our small child. I still have friends to chat with. (Family 12, mother).

2) Most families have their use of ICT and only a few use it together

Time spent on doing family activities is vital for family functioning. In this study, it was found that the opportunities family members use ICT or digital devices together tended to be for entertainment, i.e. watch TV series or video backward, playing online games with siblings, etc.

We have two televisions. One is in the basement. We watch TV together until 8 PM. Our upstairs bedroom is a common room. Children like watching TV together while doing their homework and playing games. I listen to radio news. (Family 1, father).

I play sometimes with my sister. We chat and also play games in the car. (Family 1, daughter, grade 10).

I don’t watch TV; neither do my children. We don’t watch movies. They watch only history or news together. Sometimes, we recorded them and viewed backward videos. We don't watch long movies on the computer. When we don't watch them, our children don't watch them either since their childhood. (Family 7, father).

I use IPad for doing my homework and I watch movies from the Notebook at home. Sometimes, my mom watches IPad so I watch with her in her room or otherwise we change to watch in dad’s room. We watch Korean series by connecting IPad to TV to get a bigger screen. (Family 5, daughter, grade 12).

Partly, we have to take care of grandpa so our kid has no other activities. Actually, she will leave home for the entire week. She studies from Monday to Friday and has a tutorial class during the weekends. Thus, we seldom have common activities. 70% of our activities are dinner and watching something from the computer together. We don't have TV as we don't have a stand for it. A computer and IPad are easier. On the web, M-Thai, or on Facebook, we separately watch. Our daughter watch news from Facebook as there are several hot news all over and sometimes we can use them for our conversation. If we see something undesirable, we will then show to our daughter. (Family 10, mother).

3) Children's use of ICT obstructs their studying.

Due to the adolescents' overuse of ICT, in combination with their addiction of online game and reading cartons on web, including their multi-activities at the same time, i.e. doing homework while using a Smartphone(s), etc., this affects their reading, homework, and examinations, which are the main issues most parents concern.

> My daughter asked her friend how she can be good at mathematics. Her friend said she could study every day everywhere, but my daughter said she gets bored and she'd better read cartoons, even in a toilet. This is a disaster, but she keeps saying she can survive. Every time she studied for an exam, she would complain that she's stressful and asked to watch YouTube. (Family 6, mother)

> Line, Facebook, and others make us have no concentration. During my lower secondary education, I had no concentration, but fortunately, I could pass the exam. However, at the upper secondary education, I realize that I have to study harder. (Family 7, daughter, grade 10).
>
> When my daughter reads books, she uses her Smartphone(s). We are all addicted to our Smartphone(s), so is my mother. My mother watches movies from both TV and Smartphone(s). Now, it turns to be that both grandma and granddaughter are addicted. (Family 10, mother).

> I do my homework and play on my phone at the same time. (Family 12, son, grade 10)

4) Line: household favorite device

At present, the application in social media that is very popular in Thailand is Line due to the convenience in subscription, in interpersonal communication, and in Group-Line creation in the form of texts, images, and video clips. Especially, when Smartphones become a supplementary digital device that is widely used, it is not surprising to find most families have their Family Group Line for communication, making an appointment, sharing information, expressing love and cares. Besides Family Group Line, there are also Parents Line, created for following

and supporting the children's learning in the Parents Group, and School Line, a channel used by teachers and parents for communicating between families and a school. Besides, there are a school's website and application created to help parents enable them to follow the movement of a school and children. However, from an interview with the key informants, some negative consequences of Parents Line are mentioned.

> Parents must have Parents Line, Room Line, Children Group Line. As I know, many schools have created these kinds of applications. Some Parents' Line comes from parents themselves, i.e. the results of a student's examination (such as a "pending" result from school) Parents will follow this kind of information. Sometimes, for some subjects, assignments are ordered via Line. Especially, they follow greatly a “pending” result or a school’s consideration of whether a student should take a new exam (in the past, it meant a failure). To keep the school’s reputation, most schools will allow students to free their pending status. At present, there is no more “pending” but only ‘no pass’. Besides, some schools have a High-School App, which helps to follow students, i.e. getting home late, arriving at home, etc. This kind of application has been created a while ago. For example, it can trace to see if a student wears a slip underneath. If no, the school will cut 5 scores on that student. (The reason is that some students will not wear it because it's too hot, especially when they wear in a sports suit). Most students want to keep their full scores. Thus, there are apps for following students' behaviors, for knowing the movement of the academic curriculum, visions of school, key management team, etc. (Family 2, father).

> My mom will Line to follow me or call to ask where I am, or to share images for the family. When I have a trip, I will post some images for them.” (Family 3, daughter, grade 8).

> When I’m not sure what my teachers order, I will Line to check. (Family 4, son, grade 7)

Parents Line? Yes, I have. It helps us to know if our children submit their homework. I use it to follow their homework. Besides, there is also the school's website reporting who has not submitted an assignment. We can open it to see every subject. Children cannot lie to us. (Family 7, father).

Sometimes, I use Group Line to exchange ideas or to ask my teachers. I can use when there is the internet. Without it, we cannot connect to our Line. (Family 8, daughter, grade 8)

At the elementary education, there is Teachers Line. In grade 7, there are also Parents Group Line, Group Line of friends, but not only one group, i.e. games, sports, etc. I will not follow them, but only when there is any problem with my children, then I come to clear the problems. (Family 9, father).

Most parents will chat about their children's studying and follow their children. Especially when children have not returned home, sometimes they will call to let us know, but sometimes their aunt or grandma is too worried. When they know that my daughter is with me, then they feel much relieved. Usually, my daughter does not go out. She's the center of the house. A daughter is better because at least she will call to make us relieved. Besides, she pays attention to her studies. Another subject most parents like to chat about is their children's scores or academic achievement. It depends on the parents. Some are so strict and demanding with their children that they leave the Group Line. Sometimes, they scold one another. (Family 10, mother).

5) Parents' surveillance has to be flexible.

As aforementioned, family members, especially children, possess and use ICT enormously, as the population of this group is called, "digital natives,". However, the use of ICT, including new technologies, does not only enhance but also obstruct children's studying. Besides, the use of ICT can make it easy for adolescents to access improper information and online deception. All of these risks are what parents greatly concern and wish that they can handle or supervise their use of ICT towards the

maximal benefits for their children, but on the other hand, they can protect them from all those dangers. From the statements of the parents in this study, they indicate parents' effort in adjusting their ways of handling or coping with the use of ICT of their family members with flexibility without compulsion as follows:

> Our bedroom is a common room, so we can see what they are doing. I don't like playing games so I do not pay attention to it. Actually, children are always in our sight. In the future, when they are more grown-up, we may have a personal room for them. Still, I don't think it will cause any problem as they are not unruly. We may move to our house so we will get more rooms or three bedrooms as they are growing up. In the future, they may need more privacy and have friends. I don't worry they are not unruly. (Family 1, father)

> Today, I did not pay attention to it but just left them. I may look after them but I don't know what they keep from me. We have to trust them. It's up to them. It depends on their awareness. I feel quite relieved. My children concern about their studying; although, our youngest son may not be so studious. In the future, we may have to take more care of him. (Family 7, father)

> I'm not very good at ICT, but I try to ask someone who knows or is experienced. We try to teach our daughter what is good or bad. When she grows up, she should be able to think and make decisions by herself. She will know what she has to submit to her teachers, what she has to search. Now, it is not like the old days where we went to a library. At present, technologies come to us so we have to see and listen. We have to trust our child and try not to interfere with her too much. On the other hand, we can't let her be too tolerant either. The mid-way is better. (Family 8, mother)

> Just let her learn by herself. I want her to know how to analyze the issues she exposes to. We don't have to follow her until getting old. (Family 10, mother).

They still obey us so that makes us feel relaxed. We try to insert some activities for them to have time with them. Some families may just let children be free and have no activities with them. I used to hear that the government has nothing to do. Then, it should do some blocking, that will be good to make it a little harder to access to help parents. We don't know when they turn off or if they turn off, we will never know. (Family 11, mother).

When they grow up, they will know what is good or what is bad. If they cannot distinguish these two, it means that we, as parents, fail to do so. Although I prepare things for them, it cannot get smooth in everything. What is beyond our control, we have to let it go. (Family 9, father).

"In the past, my parents used to ask for codes. They kept checking, but now we are grown up, so they do not follow us anymore." (Family 12, son, grade 10).

"I take it easy to bring up our kids, maybe a little fastidious, i.e. I will say take it easy but study and do your homework, or tell them up to what time they can play. They are boys, so it is actually not so easy to look after them, especially the middle one, he likes to protest. He's 24-hour unmannerly and very stubborn. We have to cope with him carefully. He said he will change but has not changed yet. (Family 12, mother)

6) Families establish some common rules or agreements or have some supervising methods.

Based on the foundation of family system theory, systems can be maintained with rules, which are commonly understood and accepted by members. Rules determine all kinds of members' interactions. Rules of ICT usage are the kind of rules most families settle to ensure that families can be maintained. For this study, families created some common rules or agreements loosely or had some kind of control method. For example, on the weekends, children were required to have some meals, at least one meal, together, no use of mobile phones was allowed during the meals, or no mobile phone was used during the exam, etc. All of these reflect that most mobile

phones are the major or target digital device or new technology specified in the families' rules or agreement. The following are the families' rules or agreements found in this study:

> We have no rules. When they finish doing homework, they can watch what they have saved. Our house lets them free. The old one uses his mobile phone and watches TV at the same time. Sometimes, he uses it long, i.e. playing games. However, if we warn them, they have to stop without any challenges. (Family 1, father)

> They use email, Line, and YouTube for watching movies, but not so long. After they finish their homework, they can use it long or they have to finish first before playing or going out. We don't allow them to use or play in transportation, i.e. on the bus, they are with other people, so it's easy to get any danger. (Family 2, mother).

> We limit their expenses, i.e. how much they can use at school. (Family 3, mother)

> ICT is everywhere. They may go to use it at their friends' house. In the past, teenagers liked to play at an internet café, but now it's better to have ICT, or new technologies, at home. I limit 2 hours for them but I have to keep telling so every day. When some friends advised me to allow them to play anytime during the weekends, I do so. Then I don't have to say much. Thus, they watch TV or YouTube sometimes during the weekdays. The youngest daughter will stop when I ask her to stop, probably because she has seen, since her childhood, her brother to be punished. Now, we do not allow them to play all five days during the weekdays. Thus, on Sunday, they view clips, games, YouTube, etc. Some expensive games are too expensive so they are not allowed. The older son is hard to stop. Still, I think these rules are good. (Family 4, mother)

My dad was overprotective of me like a steel bucket. My mom was worried about me because I was two years younger than my friends so she's afraid that I would be deceived. Now, I'm at the upper secondary education, they think that I'm already grown up so they let me free. Still, I have to send Line to report to them all the time to make them feel at ease. (Family 5, daughter, grade 12)

I will not play while stepping into BTS. It's too risky as I can't look around. Previously, at BTS stations, there was no blockage. I thus don't play, nor put earphones on. Neither do I play in the classroom. If I sneak to play or if my phone is seized, my parents will not get it back for me, nor will I buy a new one for me. If I need a new phone, they will consider if it's too much for me or not. When I read a book, I'm asked to take my phone away from me. (Family 7, daughter, grade 10)

My parents are very protective. No advertisement is allowed. (Family 8, daughter, grade 8).

I'm requested to go to bed at 9 PM without locking my room. If my dad knocks the door, I have to open the door immediately. My dad allows me to play games, even the violent ones but I must be able to distinguish between the virtual world and the real world, i.e. shooting is a game. It is virtual but I can't shoot in real life. (Family 9, son, grade 7).

Playing games is untrustworthy. I believe that it is a kind of addiction, which produces some kind of secretion inducing a continuous playing. I just have some loose rules. When I used too strict rules, we argued, i.e. time should be more flexible, etc. Mostly, I will regulate their bedtime, not over 9.30 PM. For new technologies, they seldom buy them. Once a while, they may buy some packages for their phones. However, I don't allow them to use more than 3G or 4G. I regulate their amount of use. If the amount is huge, it should be low-speed, and they can bear with this and use it with friends, not for playing games.

> They will play games at home. I've never seen them play n the game shop. However, rules are not rigidly fixed. (Family 9, father)

> It is quite a compulsive agreement. Yesterday, dad asked our daughter what was the agreed time since he saw some texts show up. (a boy was trying to flirt her on phone). We are very worried about this so we set four rules. 1) no calls/ no talk after 10 PM, 2) never meet someone contacting online, 3) if she wants to meet someone, her dad must accompany, and 4) if there is any adultery, she has to quit school. (Family 10, mother)

4.2.4 Conversion: The significance or effect of ICT on families

From adopting several kinds of TCT, including new technologies, into the house and they are placed in different spaces, Especially, when the families use ICT or new technologies intensely in their daily life to gratify their needs and to respond to their necessities or lifestyles, this study aims to study how ICT or new technologies have significance for and impact on their families. From the study, it is found that

1) A mobile phone is like an organ of the body

As reported earlier, mobile phones are always put aside for adolescents. Actually, no only children or adolescents who use mobile phones, but also other family members, i.e. parents, Thus, it can say that a mobile phone is like a part of an organ of the body. Some children are so addicted to mobile phones that they cannot be anywhere without them and they will feel irritated. Some parents call "mobile phones" as "the fifth necessity or requisite" besides four requisites in life as widely known.

> It is the fifth requisite; otherwise, people will not use it while taking BTS. Why won't they read books? When an accident takes place, will they know it? Because they keep looking at their phones. If they read or meditate, that will be good. I always teach my children that it's not good to do so. (Family 7, father).

2) ICT performs as an instructor

ICT can be tools used for developing education, creating a continuous learning culture for people of every age of both formal and non-formal education systems. From the interview with both parents and adolescents, both families and schools adopt ICT as a mechanism enhancing education; as a consequence, adolescents possess several kinds of ICT, including new technologies, especially Smartphones that facilitate both teachers and students to search for information, do homework and reports, prepare an exam, and answer questions or doubts that might not be related to lessons. Besides, they are used as communication media between teachers and students. Furthermore, they are like a mobile library. It thus causes a difference from learning in the past where learners had to search for information by themselves in a library. Accordingly, ICT performs like an instructor, which actually might be considered as the empowerment of educational resources for schools.

> It helps me to do reports a lot. I don't have to search for books, but just send by Line or emails very rapidly. (Family 1, daughter, grade 10)

> It is not worth for knowledge, but for entertainment. It's not necessary for children as it makes them not go out to search for knowledge by themselves. When they can't think of anything, they just search from Google, then the answers come. (Family 2, father)

> I use ICT to search for information for my studies. (Family 3, daughter)

> Their academic performance is good since their childhood. They help themselves by searching from a computer, Smartphone(s), etc., so I don't' have to help them. The studying of different generations is different, now it is the period of the new generation. (Family 3, mother).

> I learn from studying materials. On YouTube, we can find what we need. It is a good alternative for people who don't want to go out like my family. The area is very crowded and looks risky. My mom is worried so it is a fortune for me.

When I want to know anything, I just click a button. The usage of technologies depends on the user, whether we use it in a good or bad way. (Family 7, daughter, grade 10)

Everybody must have ICT, especially the internet. When my teachers ask me to search for any information. My school has WiFi, and each student will have one code. (Family 12, son, grade 10)

3) In a digital family, children tend to have higher digital skills than their parents.

Due to the digital lifestyle nowadays, families possess and use ICT regularly in their daily life. Thus, families in the modern time can be called, "digital families," while their children born in this generation are called "digital native" or "net-generation/ e-generation," which is the group of people who can use digital devices very adeptly and habitually, especially Smartphones and applications.

Mostly, a smartphone(s). My dad said the computer knows more than I. (Family 2, daughter, grade 8)

Computer. My daughter is very good at using it, so is her father because both are users. However, when the computer is out of order, he will call for her help. Our kid can fix electric appliances as well. Her father is forgetful. Now, children are faster than we are. However, when I have problems with my phone, she will not help me because I never remember what she teaches me. For her nanny, she teaches everything. Actually, she told me several times, but I never remembered. (Family 6, mother).

We have to help our father. He’s born when computers had just been introduced but for us, we’ve seen it since birth. Thus, we are more familiar and have more skills than our parents. Mistrust is not our family’s problem, but just some temporary arguments or impulsive emotion, i.e. no remembrance, so it causes

us some irritation. We try to think that they are our parents and it can help us calm down because we are quite hot-tempered. (Family 7, daughter 7, grade 10)

My dad is under one concept, or to follow determined steps. He will never hack any computer but follow rules. I like to learn about games, computers, and computer hacking. (Family 9, son, grade 7).

ICT techniques get faster, i.e. pizza delivery. My children just click to order very fast. They say I'm too old. It's a shame so now I can't raise a motto saying I had a shower with hot water before them (a Thai proverb means someone who has more experiences) (Family 9, father).

4) ICT obstructs family functioning.

Not only can ICT be a tool for educational development, but it may support families to adopt digital skills for their living, nurturing, and guiding their children. ICT can also create good family relations. All of these are family functioning. However, from the interview, it is found that ICT can also obstruct family functioning, i.e. members have less time together or for doing activities together. It also leads to a phenomenon called, "social ignoreism" or "Phubbing," or a phenomenon called, "living together separately." Consequently, it changes a family's lifestyle and causes parents' tension in looking after their children.

We live together, but separately in our family. In our family, we check Lines, view Facebook to read the news, etc., but mostly they use ICT so long that I have to ask how long they will play. Their father is addicted, so are our children. Their father is addicted because he has to use many smartphones for work; otherwise, it will get slower. (Family 5, mother)

We are not together all the time. I want to sleep in the same bedroom with our daughter, but her dad said she's grown up already. In the past, she liked to grab from me. Now, she has her phone. We are worried as she does not like to do anything, except for her smartphone(s). Thus, now she has her personal life on

that phone. Earlier, without a smartphone(s), she stayed by us everywhere we went to. (Family 6, mother)

I use a notebook computer for work. When I was in lower secondary school, I was addicted to novels. I liked reading novels, and I was addicted to friends and games. My dad was very angry. He threw away my phone. Then, I realized that I was so addicted to games that I had no time for our family. My dad is worried because my brother and I don't study so much. (Family 7, daughter, grade 10)

A day before yesterday, all family members got together at our cousin's house. Everybody was obsessed with his or her smartphone(s). (Family 10, mother)

It is easy to contact and is more convenient, but it cannot represent people. For example, to send a sticker is not always a representation. It depends on the purposes. I think it is for more efficiency but people like to use it to replace a human being, i.e. to use a robot to take care of one's child, etc. (Family 9, father)

Sometimes, it might be parents who do their functioning carelessly.

One day, my younger brother's school was closed, but my mom forgot. He viewed YouTube all day long and skipped his lunch because he forgot to eat. My mom was in the front of the house so he walked to her because he's so starving. He's so childish and didn't know that it's time he should have had his lunch. (Family 4, son, grade 7)

Some examples of a father's worry about improper websites

I'm quite worried because it surely can access my children. I try to block it and also find some other ways, i.e. asking their friends, hacking their computers, etc. However, the more I forbid, the more they use. I keep telling them that some websites are not harmful, such as gambling, pornography, etc. I used to check on his phone, I found some pornographic images. His and my perception are different. For instance, we interpreted a Japanese cartoon character wearing a bikini differently. I said it's pornographic, but he said it's not because he saw

some girls also read this cartoon book. Besides, most Thai kids are very addicted to Japanese cartoons. He told me that nowadays if we want to know our kids, we have to read cartoons. For me, the content of a cartoon book is not an issue, but the illustration is. He said I'm outdated. The cartoonist might try to convey some ideas but I cannot depict it. I focus only on the drawing of a body but I ignore the content cartoonists try to convey. When he was in grade 6, I did not know how many pornographic books he bought. I did not notice it. However, those books were withheld. I knew from his friend. His school called me. I thus keep checking. I think it should have been some in his backpack, but I could not find them. Now, he can search from Google, which is like an encyclopedia of everything, both good and bad things. How can I do anything then? At school, they teach sex education, but my kids never talk to me. They talk to each other, not their parents. I understand that they are teenagers. Like in the old days, before children wanted to buy anything, they would have asked if they could buy it or not, or if it was pornographic or not. Now, they can search for everything from Google, It's very easy. (Family 9, father).

5) Families have to support one another in the technological era or during the digital age.

Since nowadays parents cannot avoid ICT, families have to surveillance and can handle the usage of ICT towards the maximal benefits for their family members and to assure their children's safe use through some flexible agreements. Families have to follow, teach, and adjust their ways of monitoring, including finding some other activities to decrease their children's time on games or online media. Sometimes, they can consult with other people outside the family.

From the interview, some statements are found.

We need to use ICT. It's the time of ICT. As children need their parents' money to buy it, parents should be able to decide what will be useful for their children. Parents can load what they think is good, i.e. songs. However, some parents may load games for their children, which are quite costly. Parents as a policy provider should be able to control what is harmful to their children. I don't know how to do, but I have to understand ICT, such as sharing can be risky. Some

children may not be mature enough. The government also does not implement policies continually. The rules or laws cannot protect children from such harm. As an example, in South Korea, there are high numbers of websites teaching how to teach children, but in Thailand, we have tutorials for giving shortcuts for children. Thus, children nowadays like to expose to these webs for exam solutions. (Family 2, father)

We are worried about online games the most. We used to ask for advice from our friends so now we allow our children to pay during the weekends. We divide responsibilities among our family members. We may be perfectionists so we have to change ourselves too, i.e. we have to adjust our time, analyze, and then adjust ourselves. Children are like white cloth. In the past, we liked to go to a temple for praying, but now we can go out and spend time together. In the past, my husband shared some stories with our children. However, now when they are grown up. Everybody is quiet at home because they have their phone. Everyone plays on the phone. Even for our youngest daughter, now she can know how to use YouTube because her brother taught her. Thus, we have to adjust by taking them to do some activities outside, e.g. playing a radio-control plane. When our kids were small, we often cooked food for them. When they are grown up, we seldom cook. We start to take our children to play or do activities outside. Now, they will come to see me and talk to me when they finish their homework. (Family 4, mother)

I always pray for my daughter to meet only good people. During holidays, I often take her to make merits at a temple to let her see, i.e. to give food to the handicapped, etc. I will always tell my daughter that she's luckier than they to make her realize and understand. If she wants to go to a discotheque, I will let her go but I will take her by myself. Her dad will not allow her because she's a girl. My nephew told me once that Brave, my daughter, had a boyfriend. Accidentally, there's a call while she's sleeping so I looked to know who called. Brave was very disappointed and she cried. She said she cried because I did not trust her. I had to explain that I did so because I was worried about her. She said

she told me everything all the time. Did I not trust her? She said she did not want to have any boyfriend because she saw many of her friends lose their concentration on their studying. I thus apologized to her. (Family 5, mother)

Now, I don't control her. When she's small, she liked to use her phone for a long time so I often warned her of losing her sight and of extra expenses that would follow. Once she asked me to buy some screen filters so I told her nothing would happen if she just stopped doing so. Now, she's studying at grade 9, she can handle herself better so I don't have to be worried, but only ask how she's doing and ask her to be industrious. Once I looked at her Line. She had a group Line for work, but I did not read it long. I then returned her phone. I told her that I wanted to know how much she needed to use the internet because I was concerned. She replied that she had her ways to use it. As far as I read on her phone, she watched cartoons and entertainment. I asked her if she knew that her phone's with me because she forgot and left it at home. Actually, I sneakily took it. (Family 6, mother)

No. We cannot avoid it. The world can't avoid it; on the other hand, we have to be cautious not to be its victims. We have to catch up with it. (Family 7, father)

It depends on users so we have to give our children knowledge. Sometimes, they don't know so parents have to keep their eyes on it. The government may provide some digital devices for schools, but we have to make sure that students use them in the right way. Thus, for children to use any digital technology, families play a major role. If the use is beneficial, then it's good. (Family 8, mother)

We must have time for our children. Don't ever think that to be able to communicate with them via mobile phones can make them strong. It's

> impossible if we communicate to our children through a note. Parents must have time for their families. (Family 9, father)
>
> Each family has to take care of its members to create good people into a society, i.e. Journalists must post proper news and images, the government has to set rules (i.e. seductive images), to punish or to close an operation when someone violates the rules. (Family 10, mother)
>
> I don't want our youngest son to use it. He's too young so we take away from him. No, it is not an overaction. Even a mobile phone, we have to take it away. Sometimes, he hands in a smartphone(s) to his father to turn it on. Normally, we listen to music but we may have to stop doing so because he is very fast. He can scroll the screen if we don't lock it, but he can't press telephone numbers. He will make some sound when he knows that it's the sound of a phone. Anyway, I have only the numbers of my husband and children, so it will not be risky. (Family 12, mother)

In summary, this chapter presents the process of adopting new technologies of families from the qualitative research, which points out that adolescents' families own and use several digital or new technology devices of several kinds. Adolescents' home comprises social space in which family members have activities together and interact with one another. Besides, there are spaces for placing and using technologies. It is found that adolescents are familiar with ICT, starting from their familiarity with several kinds of computers at home and school, press-button mobile phones, and smartphones of their own. The adolescents' usage of ICT for their education and the role of ICT in bringing about parents' relief that they can contact with their children at all times are the main reasons parents supply ICT for their children. From being a living center where ICT is used in daily life, it makes a home as a center of several things: entertainment, working, interaction, information-processing, communication, and learning. This notion accords with the concept of Venkatesh, Kruse, and Shih (2003). On the other hand, the main new technologies causing parents' worry are smartphones and social media. Thus, in the last stage of the samples'

adoption of ICT, including new technologies, ICT is perceived as a two-edged sword, that yields both benefits for and threat on families and family functioning. Still, families must support one another to survive through several kinds of coping to maintain the equilibrium and stability of family systems.

CHAPTER 5

THE SITUATION OF THE POSSESSION AND THE USES OF NEW TECHNOLOGIES AND FAMILY COMMUNICATION

This chapter presents the research findings from the quantitative research conducted in 2018 to examine the possession and uses of new technologies, e.g. computer, tablets, mobile phones, and social media, including the situation of the family communication. The findings on general information of 808 adolescents, as samples of this study, in Bangkok, the situation of the possession and uses of new technologies based on the concept of the digital divide and the situation of family communication, including other related information are presented as follows.

5.1 General information about the samples

Table 5.1 exhibits general information of all 808 families. Regarding demographic information of adolescents in the family, it is found that most of the respondents are female (53.6%) and the rest are male (46.4%), aged 14-16, 11- 13, and 17-19 years old (51.4%, 30.7%, and 17.9% respectively) with an average age of 14.6 years old. 46.4% of them have two siblings (including the respondent), followed by having a single child (30.7%) and having three siblings up (22.9%), so the average number of siblings in the family is 2.03 persons. There are numbers of families having adolescents studying at grade 8 and 9 the most (18.8%), followed by grade 7 (17.6%), grade 11 (15.8%), grade 10 (14.9%), and grade 12 (14.1%) respectively.

On part of the adolescents' parents, 80% of them are married, 15.7% divorced, and 4.8% deceased. 56.9% of the adolescents' father is aged 40-49 years old, followed by 50 years old up (34.3%) and 30-39 years old (8.7%) respectively. The average age of fathers is 47.4 years old. The average age of the adolescents' mothers is younger than that of the fathers, namely 44.1 years old but most of them are aged 40-49 years old the

most (64.9%) as well, followed by those aged younger than 40 years old and older than 50 years (19.1% and 5.9% respectively).

Both fathers and mothers graduated with a diploma up to a bachelor's degree the most (38.7% and 42.6% respectively), followed by secondary education (25.1% and 23.9% respectively. However, the proportion of the fathers who graduated with a higher degree than a bachelor's degree is higher than that of the mothers (20.3% and 16.3% respectively). The rest of them finished their education at the lower than secondary education. (16.0% and 17.1% respectively).

In regards to the parents' occupation, it is found that they work in the area of hiring the most (34.4% and 22.4% respectively). However, the proportion of mothers who do not work is higher than that of the father (17.0% and 0.8% respectively). Other found occupations of the fathers are managers or managing directors (20.8%), vocational careers (16.0%), commerce (12.8%) respectively. Only small numbers of them work as government officials (7.9%) and private-company employees (7.3%). On the other hand, more mothers are found to do commerce than to be managers or managing directors slightly (16.6% and 15.2% respectively), following by vocational careers and private-company employees equally (11.9%) and government officials (5.0%).

Considering the adolescents' family characteristics in general, it is found that two-thirds of the adolescents' families are single or nuclear families and the rest are extended ones. Approximately, half of them have 4-5 members, followed by 2-3 members (25.1%) and more than six members (23.8%). Thus, the average number of family members is 4.8. In almost 80% of the studied families, both the father and mother live together with the adolescent while in the rest of the families, the adolescents live with either the father or the mother.

In terms of the average monthly income, it is found that most families earn 20,000-59,999 baht the most (25.4%), followed by less than 20,000 baht (16.1%), more than 100,000 baht (15.6%), and 60,000-99,999 baht (11.3%). Still, there are some families in which the adolescents do not know their family income (31.7%).

Lastly, the adolescents report that the key person who plays the main role in controlling the use of ICT is their mother more than their father (57.7% and 42.3% respectively.)

Table 5.1 General information on the quantitative-research samples collected in 2018

Demographic information		**numbers (families)**	**Percentage**
Total		**808**	**100.0**
Adolescents			
Sex	female	433	53.6
	male	375	46.4
Age (years)	11-13	248	30.7
	14-16	415	51.4
	17-19	145	17.9
	Mean	14.6	
	Range	11-18	
Sibling (persons)	1	248	30.7
	2	375	46.4
	3 up	185	22.9
	Mean	2.03	
	Range	1-7	
Education level	Grade 7	142	17.6
	Grade 8	152	18.8
	Grade 9	152	18.8
	Grade 10	120	14.9
	Grade 11	128	15.8
	Grade 12	114	14.1
Parents			
Marital Status	divorced	127	15.7
	deceased	39	4.8
	married	642	79.5
The father's age	30-39	65	8.7
(Years)*	40-49	423	56.9
	50 up	255	34.3
	Mean	47.4	
	Range	30-71	

Table 5.1 (Continued)

General information		numbers (families)	Percentage
Total		**808**	**100.0**
The mother's age (year)*	Younger than 40	148	19.1
	40-49	502	64.9
	50 up	123	15.9
	Mean	44.1	
	Range	26-64	
The father's education level*	Lower than secondary	120	16.0
	secondary	188	25.1
	diploma/ a bachelor's degree	290	38.7
	higher than a bachelor's degree	152	20.3
The mother's education level*	Lower than secondary	133	17.1
	Secondary	186	23.9
	A bachelor's degree	331	42.6
	Higher than a bachelor's degree	127	16.3
The father's occupation*	Manager, managing	158	20.8
	director	121	16.0
	Vocational careers	261	34.4
	Hiring	97	12.8
	merchant	60	7.9
	private company's employee	55	7.3
	housekeeper/unemployed	6	0.8
The mother's occupation*	Manager, managing	119	15.2
	director	93	11.9
	Vocational careers	175	22.4
	Hiring	130	16.6
	merchant	39	5.0
	private company's	93	11.9
	employee	133	17.0
	housekeeper/unemployed		

Table 5.1 (Continued)

General information		**numbers (families)**	**percentage**
Total		**808**	**100.0**
Family			
Type of family	Single/nuclear family	555	68.7
	Extended family	253	31.3
Number of family members (persons)	2-3	203	25.1
	4-5	413	51.1
	6 people up	192	23.8
	Mean	4.8	
	Range	2-19	
Parents living with the adolescent	yes	642	79.5
	no	166	20.5
The family's average monthly income (baht)	Less than 20,000	130	16.1
	20,000-59,999	205	25.4
	60,000-99,999	91	11.3
	100,000 up	126	15.6
	Unknown	256	31.7
Key person in controlling the use of ICT in the family	Father	342	42.3
	Mother	466	57.7

* = excluding deceased, unknown, and no-response persons.

5.2 The possession of new technologies in the house

According to the concept of the digital divide: stage 1 in which inequality of technology accessibility was focused, this study aims to explore the situation of the adolescents' possession and uses of technology in two aspects: the numbers of digital devices and the connection to the internet in the house as follows:

5.2.1 The numbers of digital devices in the house

Table 5.2 exhibits information about the possession of each kind of digital device and the overall possession in the house. From all found digital devices, Smartphone(s) is the most favored device used by almost every family in the house.

42.8% of them own more than 5 digital devices in the house and only 2.7% of all families do not have Smartphone(s) while more than half of them have no old-model mobile phones nor home telephones. Regarding computers, families have more notebook than desktop computers. (67.7% and 61.8%) and the numbers of the families possessing two or more than two notebook computers (17.3% and 11.4%) are higher than those possessing two or more than two desktop computers (11.6% and 6.7%) respectively. Another new digital or technology device is a tablet. It is found that there are slightly more than half of the families have more than one tablet.

Thus, from calculating all digital or new technology devices in the house, it is found that the range is 1-39 and the mean is 9.3 devices. When calculating the number of digital or new technology devices in possession per each family member, it is found that the families have no more than 2 devices per family member the most (43.7%), followed by no more than 3 devices (27.0%), no more than 1 device (15.6%), and more than two devices (13.7%) respectively. The mean is 2.1 devices and the range is 0.2-11.0 devices.

Table 5.2 The number and percentage of the possession of digital or new technology devices and the connection to the internet in the house.

Digital/new technology device		numbers (families)	Percentage
Total		**808**	**100.0**
Desktop computer (pieces)	None	309	38.2
	1	351	43.4
	2	94	11.6
	3 up	54	6.7
Notebook computer (piece)	None	261	32.3
	1	315	39.0
	2	140	17.3
	3 up	92	11.4
Tablet (piece)	None	373	46.2
	1	248	30.7
	2	118	14.6
	3 up	69	8.5
Old-model mobile phone (piece)	None	474	58.7
	1	128	15.8
	2	94	11.6
	3	62	7.7
	4 up	50	6.2
Smartphone(s) (piece)	None	22	2.7
	1	12	1.5
	2	39	4.8
	3	150	18.6
	4	239	29.6
	5 up	346	42.8
Home telephone	None	448	55.4
(piece)	1	240	29.7
	2	84	10.4
	3 up	36	4.5

Table 5.2 (Continued)

Digital/ new technology device		numbers (families)	Percentage
Total		**808**	**100.0**
Total digital devices (pieces)	Mean	9.3	
	Range	1-39	
Total numbers of digital devices per each family member (piece)	No more than 1	126	15.6
	No more than 2	353	43.7
	No more than 3	218	27.0
	3 up	111	13.7
	Mean	2.1	
	Range	0.2-11.0	
The connection to the internet in the house	Yes	684	84.7
	No	124	15.3
Types of connection (In case of having a connection to the internet in the house)	Via telephone lines	23	3.4
	LAN	75	11.0
	wireless	436	63.7
	not sure/ unknown	150	21.9

5.2.2 The connection to the internet in the house

Table 5.2 exhibits the connection to the internet in the house, which shows that 84.7% of the adolescents' families have a connection to the internet in the house, through wireless devices (63.7%), LAN (11.0%), and telephone lines (3.4%) respectively. The other 21.9% cannot specify types of connection their house has.

In summary, from considering the quantity of the digital or new technology devices and their connection to the internet in the house, it reflects unequal opportunities and convenience in accessing information among the adolescents' families during the digital divide: stage 1, found in this study.

5.3 The adolescents' use of new technologies

The digital divide: stage 2 focuses on the study on the differences in and inequality of adolescents' use of the internet, their digital skills and activities, and the digital skills of their parents. Thus, the findings on such areas in this research are presented as follows.

5.3.1 The amount of adolescents' internet usage

The study of the adolescents' internet usage includes the frequencies of their internet usage and their average length of usage in the same period per day during the past six months before the survey. Information from these two issues is created to be the number of hours each adolescent uses the internet in one month, as shown in Table 5.2.

From exploring the frequencies of the internet use during the past six months prior to the survey, it is found that in most families, the adolescents use internet every day (89.2%), and one third of them use internet more than six hours per day, followed by more than 5-6 hours (16.8%), more than 3-4 hours (14.1%), more than 2-3 hours (12.7%), and the rest used in different length of time.

Regarding the number of hours in using the internet in one month, it is found that almost half of the families use the internet more than 127 hours monthly, followed by less than 70 hours (29.0%), and 71-126 hours (25.6%) respectively. The mean of all families is 119.9 hours and the range of use is 1-182 hours. The findings indicate that adolescents use the internet very often and spend quite a long time on the internet. Besides, from the Table, it also indicates places or sites they use the internet, which found that they use the internet at home the most, followed by using the internet through their mobile phone at school.

Table 5.3 Exhibits the adolescents' usage of the internet during the past six months before the survey

The adolescents' use of internet		Numbers (families)	Percentage
Total		**808**	**100.0**
Frequencies of internet use	1-3 days per month	5	0.6
	1-4 days per week	33	4.1
	5-6 days per week	49	6.1
	Every day	721	89.2
The average length of time using the internet per day (hours)	1 or less than 1 hour	31	3.8
	More than 1-2 hours	81	10.0
	More than 2-3 hours	103	12.7
	More than 3-4 hours	114	14.1
	More than 4-5 hours	96	11.9
	More than 5-6 hours	136	16.8
	More than 6 hours	247	30.6
The total length of time using the internet in one month (hours)	Less than 70 hours	234	29.0
	71-126 hours	207	25.6
	127 hours or more	367	45.4
	Mean	119.9	
	Range	1-182	
Place or site where the internet is used the most	At home	465	57.5
	In school	10	1.2
	In an internet shop	8	1.0
	At a friend's, relative's, or acquaintance' s house	8	1.0
	Through mobile phone	317	39.2
The second place or site where the internet is used the most (only for the answer of more than one place or site)	At home	244	35.0
	In school	183	26.3
	In an internet shop	28	4.0
	At a friend's, relative's or acquaintance's house	53	7.6
	Through mobile phone	189	27.1

5.3.2 The adolescents' digital skills

The skills most adolescents report that they possess are information or knowledge inquiry (99.6%), text-sending via mobile phone (98.3%), image and audio-video uploading (91.3%), email account creation (89.1%), self-directed problem solving when facing an error (82.8%), and song or video downloading and recording (80.2%). On the other hand, junk-mail setting and filtering are reported as the least skill most adolescents possess (43.8%). Other skills at the low-skill or proficiency level are virus blocking or removal from a computer (52.5%), and online backup or cloud computing and sending service (53.6%)

From the sum of all digital skills or proficiency, it is found that the range of the digital skill or proficiency of the adolescents is 1-9 scores and the mean is 6.9 scores. When grouping these scores, it is found that most of the adolescents fall under the high digital-skill group (41.3%), followed by the moderate and low digital-skill groups (37.5% and 21.2%) respectively.

Table 5.4 Percentage of the adolescents' digital skills or proficiency and the level of digital skills classified into groups

Digital skills	Yes	no
Total of 808 families		
1. Information and knowledge inquiry	99.6	0.4
2. Text-sending via mobile phone	98.3	1.7
3. Self-directed problem solving when facing an error	82.8	17.2
4. Email account creation	89.1	10.9
5. Songs or videos uploading and recording	80.2	19.8
6. Junk-mail setting and filtering	43.8	56.2
7. Virus blocking or removal from the computer	52.5	47.5
8. Image or audio or video files uploading	91.3	8.7
9. Online backup and cloud computing and sending service	53.6	46.4

Table 5.4 (Continued)

Digital skills		Yes	no
The total scores of digital skills	mean	6.9 (from 9 scores)	
	range	1-9	
Level of digital skills (percentage) (classified by groups)	Low level (0-5 scores)		21.2 (171)
	Moderate level (6-7 scores)		37.5 (303)
	High (8-9 scores)		41.3 (334)
	Total		100.0 (808)

5.3.3 The adolescents' digital activities

The digital activities studied in this research compose of all activities related to learning, knowledge inquiry, communication, and entertainment. From the reported frequencies of each activity, such frequencies are transformed to be the mean of scores for each activity the adolescents conduct with the following criteria:

Mean lower than 1 score = low level
Mean 1-2 score(s) = moderate level
Mean higher than 2 scores = high level

From the findings, it shows that the top three digital activities the adolescents conduct the most are "listening to songs or watching movies" ($\bar{x}$ = 2.5), "using social media, i.e. Facebook, Twitter, etc." ($\bar{x}$ = 2.4), and "chats, i.e. Line, Skype, etc. ($\bar{x}$ = 2.2). The rest are "learning and knowledge inquiry, i.e. for classroom assignment" ($\bar{x}$ = 2.0), "searching information or knowledge from websites" ($\bar{x}$ = 1.8), "playing online games" ($\bar{x}$ = 1.8), "uploading and sharing text or images" ($\bar{x}$ = 1.7), "downloading programs" ($\bar{x}$ = 1.4), "sending and receiving emails" ($\bar{x}$ = 0.9), and "engaging in web boards" ($\bar{x}$ = 0.7) respectively. The last two items reflect the digital activities the adolescents do the least.

From the sum of all digital activities of the adolescents, the mean is 17.2 scores while the range falls between 0-30 scores. After classification of different levels, it is found that most adolescents fall under the "moderate-level" group (50.0%), followed by "the low-level" group (31.1%), and "the high-level" group (18.9%) respectively.

Table 5.5 Percentage and the mean of the adolescents' digital activities and the level of classified digital activities

Digital activities		never (%)	rarely (%)	often (%)	everyday (%)	Mean (scores)
Total 808 families						
1. Sending-receiving emails		25.2	64.6	7.8	2.4	0.9 (0.6)
2. Chats, i.e. Line, Skype		5.9	17.2	30.3	46.5	2.2 (0.9)
3. Searching information/ knowledge from websites		2.2	29.0	52.0	16.8	1.8 (0.7)
4. Playing online games		13.4	27.6	25.7	33.3	1.8 (1.0)
5. Engaging in web boards		50.2	35.9	11.3	2.6	0.7 (0.8)
6. Uploading/ sharing texts or images		7.3	37.1	39.0	16.6	1.7 (0.8)
7. Downloading programs		7.3	54.7	29.1	8.9	1.4 (0.8)
8. Listening to songs or watching movies		1.7	8.2	28.8	61.3	2.5 (0.7)
9. Using social media, e.g. Facebook, Twitter		3.8	14.4	20.4	61.4	2.4 (0.9)
10. Doing classroom assignments		3.6	22.2	51.4	22.9	1.9 (0.8)
The total scores of digital activities (from 30 scores)	Mean	17.2				
	Range	0-30				
The level of digital activities, classified into groups (percentage)	low (0-15 scores)			31.1 (251)		
	moderate (16-20 scores)			50.0 (404)		
	high (21-30 scores)			18.9 (153)		
	Total (numbers)			100.0 (808)		

5.3.4 The digital skills of the parents

The following table exhibits the computer and internet proficiency of the adolescents' parents reported by the adolescents. From the study, it is found that the fathers are reported to possess such proficiency at the very high and high level (19.5% and 32.4%), which is higher than that of the mothers (11.9% and 30.8%). Besides, it is found that the proportion of mothers who have no computer or internet skills is higher than that of their fathers. (6.5% and 4.0% respectively). Furthermore, to ask adolescents to compare their digital skills with those of their parents, it is found that most of them reported that both fathers and mothers have lower skills than they do. (43.9% and 49.9%), followed by having equal skills (28.9% and 30.2%), and having higher skills (27.1% and 19.9%).

Additionally, it is further found that the proportion of the mothers who ask for help or ask questions about the use of computer and internet from the adolescents is at "often" and "regularly" frequencies (29.9% and 16.2%) and is higher than their fathers (25.8% and 9.9%). Thus, the numbers of fathers who never and rarely ask for help and ask about the use of computers and the internet from adolescents are higher as well.

From the aforementioned findings, it can be concluded that in most of the adolescents' families, parents tend to have lower digital skills than their child or children and their fathers tend to have higher skills than their mothers.

Table 5.6 Digital skills of the adolescents' fathers and mothers who are still alive.

Digital skills		Fathers		mothers	
		Numbers (families)	percentage	Numbers (families)	percentage
Total		**774**	**100.0**	**798**	**100.0**
The level of computer and internet skills	None	31	4.0	52	6.5
	low	96	12.4	149	18.7
	moderate	245	31.7	256	32.1
	high	251	32.4	246	30.8
	very high	151	19.5	95	11.9
The parents' computer and internet skills, compared with those of the adolescents	lower	340	43.9	398	49.9
	equal	224	28.9	241	30.2
	higher	210	27.1	159	19.9
Ever ask for help or ask questions about the use of the computer and internet from the adolescents	never	122	15.8	90	11.3
	rarely	375	48.4	340	42.6
	often	200	25.8	239	29.9
	regularly	77	9.9	129	16.2

5.4 Other findings related to the adolescents' attitude and behaviors

This part presents the adolescents' attitude towards digital or new communication technologies, their possession and use of mobile phones, and the use of programs or applications as follows:

5.4.1 The adolescents' attitude towards the internet

From the average scores on each statement and from the criteria that the higher scores mean the agreement with the statement related with the internet, it is found that the top four statements that are agreed the most or earn the highest mean are "internet can help to improve the children's learning" ($\bar{x}$ = 3.5), "Internet can help family members to communicate to one another when they do not live together" ($\bar{x}$ = 3.5), "Children can be relaxed and amused by their usage of internet" ($\bar{x}$ = 3.4), and "internet is another way for socializing with friends" ($\bar{x}$ = 3.3). All of these statements with the highest mean indicate the samples' perceived and accepted benefits of the internet.

Besides, the other statements with fewer scores are "general people are too worried about the exploitation of adults over children on internet" ($\bar{x}$ = 2.8), "internet does not make children inactive" ($\bar{x}$ = 2.6), "to spend time on internet is safe for children" ($\bar{x}$ = 2.4), "internet does not interfere with the parents' intended teaching on values and beliefs" ($\bar{x}$ = 2.2), "too frequent use of internet does not cause children's separation from other people" ($\bar{x}$ = 2.2), and "families spending time on internet does not talk to one another less than before" ($\bar{x}$ = 2.2). Such low means reflect the adolescents' disagreement with the statements, which are found to be the negative or harmful side of the internet with diverse opinions.

From the sum of all 10 statements, it is found that the range of the adolescents' attitude towards digital or new communication technologies is 16-40 scores with an average score of 28 scores. When classified into three groups, the adolescents express the negative attitudes the most (34.9%), followed by a positive attitude (32.9%), and a rather positive attitude (32.2%).

Table 5.7 Percentage of the adolescents' opinions towards the internet and the level of attitude, classification.

statement		Strongly disagree (%)	disagree (%)	agree (%)	Strongly disagree (%)	Average score or mean
Total of 808 families						
1. The internet can help their children to improve their learning.		1.4	1.5	42.0	55.2	3.51
2. The internet can help family members to communicate to one another when they do not live together		0.6	3.6	42.2	53.6	3.49
3. The internet is another way for socializing with friends		0.9	8.9	53.8	36.4	3.26
4. General people are too worried about adults' exploitation over children on the internet,		4.7	30.0	49.0	16.3	2.77
5. Too frequent use of the internet does not cause children's separation from other people.		21.3	44.9	25.5	8.3	2.21
6. To spend time on the internet is safe for children.		13.5	44.2	32.4	9.9	2.39
7. Families spending time on the internet do not communicate less than before.		24.3	42.5	25.0	8.3	2.17
8. The use of the internet does not interfere with the parents' intended teaching on values and beliefs		16.8	50.4	25.9	6.9	2.23
9. The internet does not cause children inactive.		11.8	35.0	39.0	14.2	2.56
10. Children can be relaxed and amused by the usage of the internet.		1.5	5.4	41.2	51.9	3.43
Total scores of attitudes (from 40 scores)	Mean	28.0				
	Range	16-40				
The level of attitude towards digital or new communication technology (Percentage)	Not so good (16-26 scores)			34.9 (282)		
	Rather good (27-29 scores)			32.2 (260)		
	good (30-40 scores)			32.9 (266)		
	(total numbers)			100.0 (808)		

5.4.2 The adolescents' possession and usage of mobile phone

Almost all adolescents have their mobile phones, and almost all of the phones they possess are smartphones. Concerning the length of time talking to other people per day, 42.1% spend 1-3 hours, 31.1% less than one hour, and 26.8% more than 3 hours respectively. For adolescents who have their mobile phones, almost all of them have their mobile phones connected to the internet.

Table 5.8 The possession and usage of the mobile phone of adolescents

The possession/usage of mobile phone		numbers (families)	percentage
Total		**808**	**100.0**
Possession of mobile phone	no	8	1.0
	yes, but old-model one	17	2.1
	Yes, Smartphone	783	96.9
The average length of time using a mobile phone to talk to others per day (hours) (Only for the adolescents who have their mobile phones)	Less than 1 hour	249	31.1
	1-3 hours	337	42.1
	More than 3 hours	214	26.8
The connection to the internet	yes	788	98.5
	no	12	1.5

5.4.3 The adolescents' use of programs and applications

From the mean of all commonly-used programs and applications, YouTube is found to be used the most by the adolescents ($\bar{x}$ = 3.6), followed by Line ($\bar{x}$ = 2.8), Facebook ($\bar{x}$ = 2.6), and Instagram ($\bar{x}$ = 2.5). The programs/ applications with the lowest mean are Twitter ($\bar{x}$ = 1.3) and WhatsApp ($\bar{x}$ = 0.3). Such findings are similar to the survey, "Thailand Internet User Profile 2018" by Electronic Transactions Development Agency (Public Organization) (2019), which found that Gen Y and Gen Z, who have almost the same ages as the samples of this study, owned the following top social media the most" YouTube, Line, Facebook, Facebook Messenger, and Instagram respectively.

Table 5.9 Percentage of the adolescents' use of programs and applications during the past six months before the survey.

Program/application	never	the least	little	much	the most	mean/ S.D.
Total of 808 families						
1. Facebook	6.9	12.7	18.9	31.8	29.6	2.6 (1.2)
2. WhatsApp	85.6	4.6	7.1	2.2	0.5	0.3 (0.7)
3. Line	3.8	6.9	25.0	37.9	26.4	2.8 (1.0)
4. Twitter	48.1	12.0	14.5	12.6	12.7	1.3 (1.5)
5. Instagram	19.2	6.1	14.5	26.9	33.4	2.5 (1.5)
6. YouTube	0.1	1.2	3.7	24.9	70.0	3.6 (0.6)

5.5 Family Communication

Family communication in this study covers the use of digital or new communication technologies for family communication, the rules of using digital or new communication technologies in the family, and other relevant information related to the use of digital or new communication technologies in the family.

5.5.1 The use of ICT for family communication

All fifteen statements in Table 5.10 involve family communication in various aspects through the use of ICT and new technologies. The criteria for calculating the mean are a follows:

Mean of lower than 1 score low level
Mean of 1-2 score(s) moderate level
Mean of higher than 2 scores high level

From analyzing the mean of each statement, it is found that the use of digital or new communication technologies is “to express love and cares” the most ($\bar{x}$ = 2.1), followed by “to follow the children’s academic performance” ($\bar{x}$ = 2.0), “to provide useful information to serve family members’ needs” (2$\bar{x}$ =.0), “to teach children in various subjects” ($\bar{x}$ = 1.9), and “to listen to and share their happiness and suffering” ($\bar{x}$ = 1.8). On the contrary, the lowest means are found in the following statements respectively: “to join playing games in applications” ($\bar{x}$ = 1.2), “to talk face-

to-face on phone via applications ($\bar{x}$ = 1.2), and “to follow what the family members are doing or where they are” ($\bar{x}$ = 1.4). It is remarkable that “the use of digital or new communication technologies for expressing love and cares” is the only statement that is rated with mean at the high level.

From the sum of all fifteen-statement scores, it is found that the range of the responses is 0-45 scores and the mean is 2.52. When classified into four levels, the use of digital or new communication technologies at the low level is found the most (26.2%), followed by at the moderate level (25.9%), at the quite high level (24.0%), and the high level (23.9%) respectively. Furthermore, in Table 5.9, it also illustrates with whom the adolescents use the internet or social media to communicate the most. It is found that they use them to communicate with their mother the most as it shows that the ranking is at the first or second priority.

Table 5.10 Percentage of the use of ICT for family communication per statement and the level of the overall use for family communication during the past six months before the survey.

Statement	never (%)	Occasionally/ rarely (%)	Almost every day/sometimes (%)	Every day/ regularly(%)	Mean/S.D.
Total of 808 families					
1. To chat with family members about general subjects in daily life.	13.0	37.0	22.9	27.1	1.6 (1.0)
2. To share family members' stories, both texts or images.	13.9	40.0	27.4	18.8	1.5 (1.0)
3. To talk non-face-to-face on phone via applications	9.9	31.6	29.3	29.2	1.8 (1.0)
4. To talk face-to-face on phone via applications	25.7	41.8	18.7	13.7	1.2 (1.0)
5. To follow what family members are doing or where they are.	20.4	36.6	25.5	17.5	1.4 (1.0)
6. To send and receive audio-video clips, and songs for entertainment and amusement.	18.3	34.8	26.6	20.3	1.5 (1.0)
7. To join playing games in applications	37.1	29.0	14.9	19.1	1.2 (1.1)
8. To teach various subjects	7.3	29.2	33.2	30.3	1.9 (0.9)
9. To exchange opinions on various subjects	9.9	32.1	34.3	23.8	1.7 (0.9)
10. To express love and cares.	3.3	23.1	32.8	40.7	2.1 (0.9)

Table 5.10 (Continued)

Statement	never (%)	Occasionally/ rarely (%)	Almost every day/sometimes (%)	Every day/ regularly(%)	Mean/S.D.
11. To negotiate and establish a common understanding of conflicting issues.	7.9	34.7	32.1	25.4	1.8 (0.9)
12. To provide useful information to serve family members' needs	5.6	24.6	39.0	30.8	2.0 (0.9)
13) To find an agreement that all parties perceive and agree in common	8.0	31.7	36.8	23.5	1.8 (0.9)
14) To follow the children's academic performance.	6.8	23.5	33.4	36.3	2.0 (0.9)
15) To listen to and share happiness and suffering	8.7	30.1	29.5	31.8	1.8 (1.0)
The total scores of the use of digital or new communication technologies for family communication (from 15 scores)	Mean	25.2			
	Range	0-45			
The level of the use of digital or new communication technologies for family communication (percentage)	low (0-19 scores)			26.2 (212)	
	moderate (20-25)			25.9 (209)	
	rather high (26-31)			24.0 (194)	
	high (32-45)			23.9 (193)	
	Total (numbers)			100.0 (808)	
The family member who uses internet or social media the most (ranking no. 1)	Father			17.8 (144)	
	Mother			37.1 (300)	
	Sibling			29.3 (237)	
	Others			15.7 (127)	
	Total (numbers)			100.0 (808)	

Table 5.10 (Continued)

Statement	never (%)	Occasionally/ rarely (%)	Almost every day/sometimes (%)	Every day/ regularly(%)	Mean/S.D.
The family member who uses the internet or social media the most (ranking no. 2)	Father			38.1 (230)	
	Mother			39.6 (239)	
	Sibling			18.1 (109)	
	Others			4.1 (25)	
	Total (numbers)			100.0 (603)	

5.5.2 The rules of using ICT in the family

Among all 10 statements on the rules of using ICT in the family, the top five statements rated at the high level are “prohibition of using a phone during the meals” (62.7%), “limitation of the children’s telephone expenses” (55.9%), “restriction of time using the internet or phone at home” (49.6%), “limitation of length of time using the internet or phone at home” (49.0%), and “prohibition of disclosing family information on the internet or phone” (39.4%). Besides, the rules in the house that are rated at the low level are “Permission before using the internet” (20.4%) and “Prohibition of closing or locking the door while using the internet” (25.9%).

From the sum of all statements that are classified into levels, it is found that most adolescents perceive the rules of using digital or new communication technologies in the house at the moderate level the most (43.4%), followed by at the high level (29.5%), and at the low level (27.1%).

Table 5.11 Percentage of the rules of using ICT in the house per the statement of each rule and the level of the rules of using ICT in the house during the past six months before the survey

Statement		yes	no
Total of 808 families			
1 . The restriction of time for the children to use the internet or phone in the house.		49.6	50.4
2. The limitation of the length of time the children can use the internet or phone in the house.		49.0	51.0
3. The restriction of time for the children to use the internet or phone outside the house.		32.7	67.3
4. The limitation of the length of time the children can use the internet or phone outside the house.		30.2	69.8
5. The monitoring of the websites the children view		38.1	61.9
6. The prohibition of closing or locking the door while using the internet.		25.9	74.1
7. The prohibition of disclosing family information on the internet and mobile phone		39.4	60.6
8. Prior permission from the parents before using the internet.		20.4	79.6
9. The limitation of the children's telephone expenses.		55.9	44.1
10. The prohibition of using a telephone during meals.		62.7	37.3
The total rules of using digital or new communication technologies in the family (numbers)	Mean	4.0	
	Range	0-10	
The level of the rules of using digital or new communication technologies in the family (percentage)	low (0-2 rules)	27.1 (219)	
	moderate (3-5 rules)	43.4 (351)	
	high (6-10 rules)	29.5 (238)	
	Total	100.0 (808)	

5.5.3 Other information about the use of ICT in the family.

The other finding in the study is the issue of trust. Slightly more than half of the adolescents reported that their parents trust them to use computer/internet/mobile phone with responsibility at the moderate level, while the rest of them at the high level (37.0%), low level (5.2%), and never trust them (2.5%) respectively. Being asked if their parents know what or what kind of activities they are doing while using computer, internet, or mobile phone, approximately half of the adolescents expressed their agreement at the moderate level, followed by at the low level (21.4%) at the high level (or know everything) (20.7%), and never (7.3%).

Besides, from the parents' opinions towards the computer and the internet, some similarities are found. Parents expressed their slight dislike the most (fathers 39.5% and mothers 42.2%), followed by "neutral" (fathers 35.1% and mothers 33.8%), "like very much" (fathers 22.9% and mothers 19.7%), and "not like at all" (fathers 2.5% and mothers 4.3%) respectively. It is further found that fathers tend to have more positive opinions than mothers.

Table 5.12 The other information about the use of ICT among family members.

Statement		Numbers (families)	Percentage
Total		**808**	**100.0**
To what extent do your parents trust in your responsible use of a computer, internet, mobile phone?	Never	20	2.5
	Low	42	5.2
	Moderate	447	55.3
	High	299	37.0
Do your parents know what or what kind of activities you do while using a computer, internet, mobile phone?	Never	59	7.3
	Low	173	21.4
	Moderate	409	50.6
	High/everything	167	20.7
The alive fathers' opinion towards their children's use of computer and internet (774 families)	Not like at all	19	2.5
	Neutral	272	35.1
	Slightly dislike	306	39.5
	Like very much	177	22.9
The alive mothers' opinion towards their children's use of computer and internet (798 families)	Not like at all	34	4.3
	Neutral	270	33.8
	Slightly dislike	337	42.2
	Like very much	157	19.7

In short, this chapter presents the situation of the possession and usage of new technologies of the adolescents in Bangkok and the situation of family communication, which is found that all adolescents have at least one digital or new technology device in their house and most of them have the connection to the internet. For the usage of new technologies, e.g. the internet, it is found that adolescents often use the internet and spend a long time on it. For digital skills, the average mean is at a good level. Besides, it is found that in the adolescents' opinion, they tend to have better digital skills than their mother and some of them have better skills than their father and mother. Most of the digital activities that adolescents often do are entertainment and social activities. Furthermore, adolescents' families use ICT for family communication at a low and moderate level almost ‹

CHAPTER 6

FAMILY FUNCTIONING

This chapter presents the findings on the situation of the family functioning and factors affecting the family functioning. The analysis of the situation of the family functioning is univariate analysis in the form of descriptive statistics. The relationship between family characteristics, digital divide, and family functioning is analyzed. In other words, the differences of family functioning are classified by family characteristics and digital divide by a multivariate analysis by comparing means of multiple dependent variables. Besides, a correlation coefficient is used to measure the relationship between variables to test the multicollinearity and multivariate analysis by multiple regression is also conducted to investigate which independent variables are associated with family functioning of the adolescents' families in Bangkok, while the effect of other independent variables is controlled.

6.1 The Situation of Family Functioning

Family functioning, a major phenomenon focused in this study, is measured by the total scores of 15 sub-questions of how family members treat one another in the family and presented in the form of percentage of the frequency of their treatment during six months before the survey period as shown in Table 6.1. The choices of frequency are "never, rarely/occasionally, almost every day, and every day." Thus, the scores are from 0-3 respectively. Mean of lower than 1 is classified as "low frequency", between 1-2 "moderate frequency," and higher than 2 "high frequency." Besides, from all 15 sub-questions, family functioning is divided into 5 functions:

1) The cultivation of skills and knowledge
2) The nurture of well-being
3) Communication about media
4) The establishment of family relations
5) The establishment of relations with external networks.

From the study, it is found that the average score of the total 15 family functionings is 28.9 scores (range 1-45). When analyzing the mean of each family functioning, the following results are found: the nurture of well-being ($\bar{x}$ = 2.5), the establishment of family relations ($\bar{x}$ = 2.0), communication about media ($\bar{x}$ = 1.8), the establishment of relations with external networks ($\bar{x}$ = 1.8), and the cultivation of skills and knowledge ($\bar{x}$ = 1.7). The nurture of well-being is the only family functioning falls under the high-level mean.

From analyzing sub-functions of a family under each main family functioning, it is found that "family members help to do homework" has the highest mean in the family functioning of the cultivation of skills and knowledge ($\bar{x}$ = 2.1), and "family members do religious activities together" and "family members facilitate your studying" have the lowest mean ($\bar{x}$ = 1.6). For the family functioning in nurturing the family's well-being, "family members take care of your sanitary habits" has the highest mean ($\bar{x}$ = 2.6), which is higher than "family members take care of you when you are sick" ($\bar{x}$ = 2.5). For the family functioning in communication about media, "family members talk about information from various media creatively," ($\bar{x}$ = 2.0), which is higher than "family members teach or advise how to use the internet or to access websites ($\bar{x}$ = 1.5). Regarding the family functioning in the establishment of family relations, "family members express their love and helpfulness for one another" has the highest mean ($\bar{x}$ = 2.2) and "family members talk and agree about the rules of the house" has the least mean ($\bar{x}$ = 1.7). Concerning the family functioning in establishing relations with external networks, "family members support cousins/relatives living apart when they have problems," ($\bar{x}$ = 1.9), which is higher than "the family plays a part in supporting neighbors/ communities ($\bar{x}$ = 1.6).

In summary, adolescents' families in this study perform their family functioning at the moderate level by performing the function of nurturing family members' well-being at the high level while family members express their love and engagement in the family at the moderate level; however, the mean is higher than those of other functionings, which are also performed at the moderate level.

Table 6.1 Exhibits the percentage and frequencies of each main family functioning and its sub-functionings.(808 adolescents)

Family functioning	never (%)	rarely (%)	occusionally (%)	Regularly (%)	Mean (S.D.)
1) The Cultivation of Skills and Knowledge					**1.7 (0.6)**
1. Family members facilitate your studying	7.1	44.6	26.5	21.9	1.6 (0.9)
2. Family members help you to do other activities besides studying	6.2	40.8	32.4	20.5	1.7 (0.9)
3. Family members help to do homework	4.0	24.8	33.5	37.7	2.1 (0.9)
4. Family members do religious activities together	9.8	44.2	22.2	23.9	1.6 (1.0)
2) The Nurture of Well-Being					**2.5 (0.6)**
1. Family members take care of you when you are sick	1.2	12.7	22.6	63.4	2.5 (0.8)
2. Family members take care of your sanitary habits	1.5	8.8	23.1	66.6	2.6 (0.7)
3) Communication about Media					**1.8 (0.8)**
1.. Family members talk about information from various media creatively.	3.8	25.1	38.5	32.5	2.0 (0.9)
2. Family members teach or advise how to use internet or to access websites	11.9	41.8	27.0	19.3	1.5 (0.9)
4) The Establishment of Family Relations					**2.0 (0.6)**
1. Your family openly talks and agrees about rules of the house.	15.1	31.6	23.0	30.3	1.7 (1.1)
2. Family members express their love and helpfulness for one another	2.6	19.9	33.4	44.1	2.2 (0.8)

Table 6.1 (Continued)

Family Functioning	Never(%)	Rarely (%)	Occasionally (%)	Regularly (%)	Mean (S.D)
3. Family members have an opportunity to join doing activities all together.	3.5	32.9	32.9	30.7	1.9 (0.9)
4. Family members solve problems or conflicts rationally.	4.6	27.4	33.9	34.2	2.0 (0.9)
5. Family members have an opportunity to have dinner together.	3.1	24.3	28.3	44.3	2.1 (0.9)
5) The Establishment of Relations with External Networks					**1.8 (0.7)**
1. Your family plays a part in supporting neighbors and communities	8.3	40.1	35.1	16.5	1.6 (1.0)
2. Your family supports cousins/relatives living apart when they have problems.	2.8	32.2	35.1	29.8	1.9 (0.9)
The average scores of family functioning (total 15 sub-functions) (Range 1-45)					**28.9 (7.7)**

6.2 The Relationship between Family Characteristics, Digital Divide, and Family Functioning by Bivariate Analysis

The analysis of the differences of family functioning classified by the studied variables is based on the mean of family functioning scores collected six months before the survey period.

From Table 6.2, from analyzing some characteristics of families: types, numbers of family members, staying together or separately with parents, and family income, it is found that the overall and individual family functioning of the adolescents' families which are extended have a little higher mean than those which are single or nuclear in cultivating skills and knowledge and the establishment of relations with external networks. On the other hand, the families with more family members have a higher mean of overall family functioning as well, except in nurturing well-being of the family and communication about media, which have the equal mean. Families in which

adolescents live with both a father and a mother have a higher mean of both overall and individual family functioning than those in which adolescents live with either a father or a mother. Besides, it is found that adolescents' families with higher average monthly income have a higher mean of family functioning that those with lower income.

Regarding family characteristics relating with who is the key person having main roles in the use of ICT in the family, it is found that the families in which the father is the key person have a higher mean of the family functioning in cultivating skills and knowledge than those in which the mother is the key person. For other functionings: the nurture of well-being, the establishment of family relations, and the establishment of external networks, both kinds of families have equal means. However, in the family functioning of communication about media, the families in which a mother is the key person have a higher mean that those in which a father is the key person.

Concerning the age of the key person who has main roles in controlling the use of ICT in the family, slight differences of mean are found. For the overall family functioning, it is found that key persons aged 40-49 years old have a higher mean than those of older ages and younger ages respectively. In terms of family functioning in cultivating skills and knowledge and communication about media, it is found that key persons of younger-age groups have a higher than mean than those of the oldest-age group. On the contrary, key persons of older-age group have a higher mean in the functioning of establishing family relations and relations with externa networks than those of younger-age groups. For the functioning of the nurture of well-being, every age group has almost equal mean.

In part of education, it is found that families where key persons have higher education tend to have a higher mean of family functioning as well, except in the functioning of cultivating skills and knowledge in which key persons graduated from secondary education and with diploma/a bachelor's degree have a higher mean of family functioning than those graduated with higher degree than a bachelor's degree and lower than secondary education. As for communication about media, it is found that families where key persons graduated from secondary education have the lowerst mean.

Another characteristic of families is "occupation", which is found that key persons who are unemployed have the highest mean of the overall family functioning

and of the family functioning in cultivating skills and knowledge. For other functionings, except the establishment of external networks, key persons who are managers/directors and unemployed have the highest mean equally.

Furthermore, it is found that families of male adolescents perform the overall family functioning and their functioning in cultivating skills and knowledge at the higher level than families of female adolescents. For ages of adolescents, it is found that families of adolescents with oldest-age group have the higest mean in the nurture of well-being while no differences are found in the functioning of communication about media and the establishment of family relations. However, it is found that families with youngest-age and oldest-age groups have the highest mean equally in establishing the relations with external networks.

Table 6.2 Exhibits means of family functioning classified by family characteristics.

Family characteristics		Family functioning					
		Total scores	1	2	3	4	5
Total (persons)	**808**						
Families							
Type							
Nuclear family	555	28.8	1.7	2.5	1.8	2.0	1.7
Extended family	243	29.4	1.8	2.5	1.8	2.0	1.8
Numbers of family members (persons)							
2-3	203	28.5	1.7	2.5	1.8	1.9	1.7
4-5	413	28.8	1.7	2.5	1.8	2.0	1.7
6 up	192	29.7	1.8	2.5	1.8	2.0	1.8
Both father and mother living with the adolescent							
yes	642	29.7	1.8	2.6	1.8	2.0	1.8
no	166	26.1	1.6	2.3	1.5	1.7	1.6
Average monthly income (Baht)*							
< 20,000	130	27.8	1.7	2.4	1.6	1.9	1.7
20,000 -59,999	205	29.2	1.8	2.5	1.8	2.0	1.8
60,000-99,999	91	29.3	1.8	2.5	1.8	2.0	1.8
100,000+	126	30.9	1.8	2.6	1.9	2.2	1.9
Key person who has main roles in the use of ICT in the family							
Mother	466	28.9	1.7	2.5	1.8	2.0	1.8
Father	342	29.2	1.8	2.5	1.7	2.0	1.8
Age (year)*							
30-39	120	28.4	1.8	2.5	1.8	1.9	1.7
40-49	481	29.3	1.8	2.5	1.8	2.0	1.8
50 up	180	28.9	1.7	2.5	1.7	2.0	1.8

Table 6.2 (Continued)

Family characteristics		Family functioning					
		Total Scores	**1**	**2**	**3**	**4**	**5**
Total (persons)	**808**						
Education level*							
Lower than secondary	122	27.8	1.7	2.4	1.6	1.9	1.8
secondary	195	29.0	1.8	2.5	1.8	2.0	1.7
diploma/a bachelor's degree	325	29.2	1.8	2.6	1.8	2.0	1.8
higher than a bachelor's degree	147	29.8	1.7	2.6	2.0	2.0	1.8
Occupation*							
Manager/ director	157	30.1	1.8	2.6	1.9	2.1	1.8
professional	122	28.5	1.7	2.5	1.8	2.0	1.8
hireling	208	27.8	1.7	2.4	1.6	1.9	1.7
commerce/entrepreneurs	126	29.0	1.8	2.5	1.8	2.0	1.8
government/private employees	119	29.6	1.8	2.6	1.8	2.0	1.8
unemployed	65	30.3	1.9	2.6	1.9	2.1	1.7
Adolescents							
Sex							
female	433	28.9	1.7	2.5	1.8	2.0	1.8
male	375	29.0	1.8	2.5	1.8	2.0	1.8
Age (year)							
11-13	248	29.2	1.8	2.5	1.8	2.0	1.8
14-16	415	28.9	1.7	2.5	1.8	2.0	1.7
17-19	145	28.8	1.6	2.6	1.8	2.0	1.8

* = excluding "no response" and "don't know"

1 = Cultivation of skills and knowledge, 2 = Nurture of well-being, 3 = Communication about media, 4 = Establishment of family relations, 5 = Establishment of relations with external networks.

Table 6.3 exhibits the comparison between the means of the family-functioning variables under the concept of the digital divide in the first stage and in the second stage. The first variable is the number of digital devices in the house, which is found that adolescents in the families with more digital devices in the house have a higher mean of the overall and individual family functioning. For the connection to the internet, it is found that adolescents in the families whose internet is connected have a higher mean of the overall and individual family functioning apparently.

Concerning the use of the internet, it is found that adolescents who use the internet monthly in the least amount have the highest mean of the overall and individual family functioning, except in the establishment of family relations and relations with external networks. For digital skills, it is found that adolescents with higher digital skills have a higher mean of the overall and individual family functioning remarkably, which accords with the findings on adolescents' digital activities. It is found that adolescents doing more digital activities have a higher mean of the overall and individual family functioning.

From the analysis of digital skills of the key person playing main roles in the use of ICT in the house, the same direction of findings is found. Namely, adolescents in the families where the key person has higher digital skills than adolescents have a higher mean of the overall and individual family functioning.

The last variable in Table 6.3 is the use of ICT for family communication, which is found that adolescents in the families with more usage of ICT for family communication have a higher mean of family functioning than those with less usage.

In brief, the bivariate analysis of the relationship between family characteristics, digital divide, the use of ICT for family communication, and family functioning is to indicate the direction trend of the relationship of each pair of variables, and to test the congruence and incongruence with the hypotheses. However, the analysis of the relationships or differences found does not control the effect of variables. Hence, the next part is the multiple regression analysis to test the relationship of each pair by controlling the effect of other variables

Table 6.3 Exhibits the means of the overall and individual family functioning classified by the digital divide and the use of ICT for family communication

Family characteristics		**Family functioning**					
		Total	**1**	**2**	**3**	**4**	**5**
Total (persons)	**808**						
Digital divide: stage 1							
The numbers of digital devices in the house (pieces per person)							
No more than 1	126	28.3	1.8	2.5	1.7	1.9	1.7
No more than 2	353	28.2	1.7	2.5	1.7	1.9	1.7
No more than 3	218	29.9	1.8	2.6	1.9	2.1	1.8
3 up	111	30.1	1.8	2.6	2.0	2.0	1.8
The connection to the internet							
connected	684	29.3	1.8	2.5	1.8	2.0	1.9
no connection	124	26.9	1.7	2.4	1.6	1.8	1.7
Digital divide: stage 2							
Adolescents' amount of internet usage (hours per month)							
0-70	234	30.0	1.8	2.6	1.9	2.0	1.8
71-126	207	27.7	1.7	2.5	1.7	1.9	1.7
127 up	367	28.9	1.7	2.5	1.8	2.0	1.8

Table 6.3 (Continued)

Family characteristics		Family functioning					
		Total	**1**	**2**	**3**	**4**	**5**
Total (persons)	**808**						
Adolescents' digital skills							
Low	171	26.6	1.6	2.4	1.6	1.8	1.6
Moderate	303	28.9	1.8	2.5	1.7	2.0	1.7
High	334	30.2	1.8	2.6	1.9	2.1	1.9
Adolescents' digital activities							
Low	251	27.1	1.6	2.4	1.7	1.9	1.7
Moderate	404	29.1	1.8	2.5	1.8	2.0	1.7
High	153	31.5	1.9	2.7	2.0	2.2	2.0
Digital skills of key person playing main roles in the use of ICT in the family							
	127	26.4	1.6	2.4	1.5	1.8	1.7
	224	27.7	1.7	2.5	1.7	1.9	1.7
Low	286	29.3	1.8	2.5	1.8	2.0	1.8
Moderate	171	31.8	1.9	2.7	2.1	2.2	1.9
High							
Very high							
The use of ICT for family communication							
Low	212	23.0	1.4	2.3	1.3	1.5	1.4
Moderate	209	27.1	1.6	2.4	1.6	1.9	1.7
High	194	31.2	1.9	2.6	1.9	2.2	1.9
Very high	193	35.2	2.2	2.8	2.3	2.4	2.2

1 = cultivation of skills and knowledge, 2 = nurture of well-being, 3 = communication about media, 4 = establishment of family relations, 5 = establishment of relations with external networks

6.3 The Multiple Regression Analysis of the Variables Related with Family Functioning

Since the data on family income cannot be recalled or specified by almost one-third of all the samples, family income is thus extracted from this analysis. Still, the numbers of the samples that can be analyzed are close to the numbers at the starting and are sufficient for the analysis.

Due to the multiple regression analysis, it is stipulated that variables must be interval scale to be able to create dummy variables that represent the categories of the categorical and ordinal independent variable. The value of the studied group is 1 while the reference group is 0. The findings of the analysis are as follows:

Family Characteristics

1. Types of families

Extended family	= 1
Nuclear family	= reference group = 0

2. To have both a father and a mother live with an adolescent

living with both	= 1
Living with either	= reference group = 0

3. The relationship of the person playing main roles in the use of ICT in the house with

Mother	= 1
Father	= reference group = 0

4. Education level of the person playing main roles in the use of ICT in the house with the

Higher than a bachelors' degree	= 1
Diploma/a bachelor's degree	= 1
Secondary education	= 1
Lower than secondary education	= reference group = 0

5.Occupation of the person playing main roles in the use of ICT in the house with the adolescent

Manager/director	= 1
Professional	= 1
Commerce/ entrepreneurs	= 1
Government/ private –company employee	= 1

Unemployed	= 1
Hireling	= reference group = 0

6. Sex of the adolescent

Female	= 1
Male	= reference group = 0

Digital divide: stage 1

1. The numbers of digital devices in the house

3 devices up	= 1
No more than 3	= 1
No more than 2	= 1
No more than 1	= reference group = 0

2. The connection to the internet

Connected	= 1
No connection	= reference group = 0

Digital divide: stage 2

3. Digital skills of the person playing main roles in the use of ICT in the family

Very high	= 1
High	= 1
Moderate	= 1
Low	= reference group = 0

Before conducting the multiple regression analysis, a linear relationship of variables is tested, as shown in Table 6.4, but no independent variable of any pair has the relationship value or value of R of more than 0.8, which is the criterion for screening independent variables for the study. Accordingly, all independent variables are included in the multiple regression analysis. Still, some pairs of variables that have a relationship at the statistical significance level are found as follows:

1) Extended families have a positive relationship with the numbers of family members at the moderate level (0.571), which indicates that families that are extended have more family members than those that are nuclear.

2) Mothers, as the person playing main roles in the use of ICT in the family, have a positive relationship with the age of the person playing main roles in the use of

ICT in the family at 0.333, which indicates that the key person playing main roles in the use of ICT in the family who is a mother is older than a father, as the key person.

3) To have both a father and a mother live with an adolescent has a negative relationship with the key person playing main roles in the use of ICT in the family who is a mother at -0.200, which indicates that in the families that both a father and a mother live with an adolescent, the key person playing main roles in the use of ICT in the family is a father more than families that only a father or a mother lives with an adolescent.

4) The key person playing main roles in the use of ICT in the family who is a mother tends to be unemployed more than families where a father is the key person.

5) The key person playing main roles in the use of ICT in the family educated with a higher degree than a bachelor's degree has a positive relationship with the key person in the position of a manager or director at 0.229, and has a positive relationship with the key person of various professions at 0.279. These findings indicate that the key person playing main roles in the use of ICT in the family tends to be a manager or director or works in other professions more than that graduated with the educational level of lower than secondary education.

6) The key person playing main roles in the use of ICT in the family with high digital skills has a positive relationship with that graduated with a higher degree than a bachelor's degree at 0.222, and also has a positive relationship with the use of ICT for family communication at 0.241. This means that the key person playing main roles in the use of ICT in the family with a higher degree than a bachelor's degree tends to have very high digital skills than that with lower education than secondary education. On the other hand, adolescents in the families where the key person has very high digital skills tend to come from a family where ICT is used highly for family communication.

7) Adolescents' digital skills have a positive relationship with adolescents' digital activities at 0.260. This indicates that when adolescents have higher digital skills, they tend to have more digital activities as well.

Table 6.4 The matrix showing relationships among predictor variables of family functioning

	variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Extended family	1.00												
2.	The numbers of family members	.571**	1.00											
3	Both father and mother live with the adolescent	-.106**	-.026	1.00										
4.	Mother is the key person	.033	.044	-.200**	1.00									
5.	Age of the key person	-.083*	-.080*	.177**	-.333**	1.00								
6.	Higher than a bachelor's degree	.049	-.002	.124**	-.153**	.181**	1.00							
7.	Diploma, a bachelor's degree	.046	-.027	.075*	.004	.040	-.400**	1.00						
8.	Secondary education	.000	.018	-.127**	.048	-.165**	-.205**	-.480**	1.00					
9.	Manager/ director	.024	-.034	.043	-.111*	.096*	.229**	.104*	-.183**	1.00				
10.	Professionals	.034	-.003	.065	-.058	.143**	.279**	.042	-.154**	.211**	1.00			
11.	Commerce/entrepreneurs	.002	.043	-.049	.059	-.109*	-.154**	-.063	.067	-.215**	-.184**	1.00		
12.	Government/ private-compnay employee	.042	.006	.069*	-.061	.007	.002	.175**	-.075*	-.208**	-.178**	-.182**	1.00	
13.	Unemployed	-.054	.037	-.011	.228**	-.028	-.107*	.036	.023	-.148**	-.127**	-.129**	-.125**	1.00
14.	Female adolescent	.050	.043	-.043	-.004	.007	.053	.051	.029	-.020	-.010	-.059	.058	-.017
15.	Age of adolescent	-.054	-.006	-.014	-.007	.172**	.027	-.039	-.024	.056	.013	-.042	-.074*	.021
16.	Have more than 3 digittal devices	-.107**	-.166**	.105**	-.073*	.103*	.099*	.124**	-.171**	.147**	.030	-.085*	-.026	.066
17.	Have no more than 3 devices	-.074*	-.130**	.109**	-.055	.129**	.156*	.048	-.097**	.106**	.088*	-.069	.040	-.015
18.	Have no more than 2 devices	.051	.073*	.021	.022	-.074*	-.086*	-.045	.059	-.103**	-.056	.044	.031	-.030
19.	Connection to the internet	.073*	.114**	.115**	-.128**	.118**	.129**	.166**	-.153**	.103**	.091*	.019	.098**	.023
20	Adolescent's internet use	-.028	.004	-.090**	.038	-.087*	-.111*	-.058	.068	-.028	-.106**	.025	-.027	-.029
21.	Adolescent's digital skills	.004	-.027	.017	.028	.012	.010	.023	.012	.063	-.014	.011	-.027	-.015
22	Adolescent's digital activities	-.021	.004	-.012	-.018	-.003	-.056	.077*	.028	.043	-.036	-.013	.023	-.023
23	Key person with very high digital skills	.068	-.001	.046	-.157**	-.079*	.222**	.022	-.087*	.110**	.109**	-.116	-.076*	.047
24	Key person with high digital skills	.047	-.021	.043	-.052	.043	.041	.135**	-.073*	.076*	.013	-.123**	-.026	.102**
25	Key person with moderate digital skills	-.054	.061	-.034	.049	.060	-.116**	-.030	.106**	-.083*	-.041	.086*	.029	-.011
26	Use of ICT for family communication	-.021	-.003	.059	-.004	-.045	.006	.042	-.037	.068	-.039	.007	.043	.016

Table 6.4 (Continued)

Variables	14	15	16	17	18	19	20	21	22	23	24	25	26
1. Extended family													
2. Numbers of family members													
3 Both father and mother live with the adolescent													
4. Mother is the key person													
5. Age of the key person													
6. Higher than a bachelor's degree													
7. Diploma/ a bachelor's degree													
8. Secondary education													
9. Manager/ Director													
10. Professionals													
11. Commerce/ entrepreneur													
12. Government/ private-company employee													
13. Unemployed													
14. Female adolescent	1.00												
15. Age of adolescent	.044	1.00											
16. Have more than 3 digital devices	.018	-.021	1.00										
17. Have no more than 3 digital devices	-.021	.018	-.016	1.00									
18. Have no more than 2 digital devices	.029	.023	-.050	-.535**	1.00								
19. Connection to the internet	-.038	.028	110**	.166**	-.026	1.00							
20 Adolescent's internet use	.113**	.001	.011	-.052	.062	-.016	1.00						
21. Adolescent's digital skills	-.099**	.074*	.075*	.040	-.003	.105**	.098**	1.00					
22 Adolescent's digital activities	.029	-.009	.076*	.060	-.041	.066	.166**	.260**	1.00				
23 Key person with very high digital skills	.027	-.062	.172**	.129**	-.133**	.128**	.043	.096**	.115**	1.00			
24 Key person with high digital skills	.102**	-.030	.013	.034	.011	.078*	-.037	.011	.061	-.384**	1.00		
25 Key person with moderate digital skills	-.094**	.001	-.095**	-.065	.084*	-.043	-.027	-.019	-.081*	-.321**	-.458**	1.00	
26 Use of ICT for family communication	.085*	-.030	.059	.034	-.046	.085*	.030	.145**	.241**	.174**	.044	-.061	1.00

* at the .05 statistical significance level

** at the .01 statistical significance level

The multivariate analysis of the relationship between family functioning and independent variables by multiple regression analysis in this study focuses on the functioning of 761 adolescents' families as a whole. Table 6.4 exhibits the variance analysis of each independent variable and family functioning with statistical significance by controlling the effect of other independent variables. Besides, it indicates which independent variable can explain the variance of family functioning the best and to what extent all independent variables can explain the variance of family functioning

From the analysis, the following is found:

The use of ICT for family communication is the most important or influential independent variable on family functioning with statistical significance. Namely, adolescents in the families where ICT is used for family communication at high level are found to perform family functioning at a higher level as well. (B = 0.518). Thus, the relationship found is congruent with the hypothesis of this research and accords with the finding of Korakot Sanjit (2019), which found the roles of social media in increasing the effectiveness of family functioning relating to teaching, affect display, expression of love and engagement, and collective problem-solving.

Another variable found to be related with family functioning is "an adolescent's living with both a father and a mother." In other words, the adolescents living with both their father and mother have a higher level of family functioning than those who live with either their father or mother. (B = 3.092). Thus, such relationship is as hypothesized. This indicates the importance of having both a father and mother live together with an adolescent since it can be a good example for their child or children and enhance their family activities together. (Bryant, 1992)

The next variable found to be related with family functioning is digital skills of the person playing main roles in the use of ICT in the family. In this study, it is found that adolescents in the families where the person playing main roles in the use of ICT in the family has very high digital skills have a higher level of family functioning than those where the key person having low digital skills. (B = 1.417). This relationship is as hypothesized; however, the relationship is only partial because no relationships are found in the families where the key person has high or moderate digital skills. Still, it can explain the relationship between the skills of using ICT and the amount of using

ICT in the family. The more skills the key person has, the more opportunities he or she can use ICT for doing actitivies related with family functioning.

Adolescents' sex is another variable found to be related with family functioning with statistical significance. Female adolescents are found to perform family functioning at the lower level than male (B = -0.929). This relationship thus confirms the hypothesis that family functioning and sex of adolescents are related, which supports the concept of sex whose roles are expected by the society. (Passorn Limanon, 2001) and sex of a child or children also involves social-structure issues, which is a family characteristic that affect children's life opportunities. (Weeks, 2005)

The occupation of the person playing main roles in the use of ICT in the family is found to be related with family functioning with statistical significance. Compared with the families where the person playing main roles in the use of ICT in the family who works in hireling area, the families where the key person is unemployed are found to perform family functioning at a higher level (B= 1.732). Such relationship is congruent with the hypothesis of this study or the family functioning has an inverse or a negative relationship with the occupation of the key person playing main roles in the use of ICT in the family. However, the finding is congruent only partially with the hypothesis since no relationships are found in other occupations, i.e. manager/director, professionals, commerce or entrepreneur, government and private-company employee. Nevertheless, it indicates the importance of time the person playing main roles in the use of ICT in the family giving should give to their children regularly. (Bryant, 1992)

Digital skills are also found to be related with family functioning at the statistical significance level. (B = 0.265). Compared with adolescents with lower digital skills, those with higher digital skills perform more family functioning. Thus, this relationship is as hypothesized that family functioning has a positive relationship with adolescents' digital skills. Therefore, adolescents' digital skills are positively related with the use of digital devices and cause no negative effect on family functioning. On the contrary, they can induce family members to do activities together and thus enhance family functioning.

The type of family is the last variable that is found to be related with family functioning with statistical significance. Namely, compared with adolescents in nuclear families, those in extended families are found to perform more family functioning (B =

0.938), as hypothesized that family functioning is related with the type of family, and accords with the concept of Weeks (2005) and Karoly (2008), which give high importance to the roles of family members, i.e. grandparents, uncles, aunts, etc. in family functioning.

Table 6.5 Exhibits the variable selection in the ordinal multiple regression equation

No	Independent variable	Regression coefficient (B)	Predictable variation (R^2)	Statistical significance level (Sig.)
1	The use of ICT for family communication	.518	.397	.000
2	Adolescent's living together with both a father and a mother	3.092	.422	.000
3	Very high digital skills of the person playing main roles in the use of ICT in the family (reference group = low)	1.417	.428	.006
4	Female adolescent (reference group = male adolescent)	-.929	.432	.030
5	Unemployed person playing main roles in the use of ICT (reference group = hireling)	1.732	.435	.027
6	Adolescent's digital skills	.265	.439	.038
7	Extended family (reference group = nuclear family)	.938	.442	.039

All the above independent variables can explain the variation of family functioning and the prediction variance is 0.442 or 44% of all variances and the use of ICT for family communication is the variable that can predict the variance of family functioning the most.

In summary, the findings in this chapter present the family functioning of the adolescents in Bangkok in 2018, which is found at the moderate level. The family

functioning that obtains the highest mean is the nurture of well-being. From analyzing the relationship between family functioning and variables by bivariate analysis from the comparison of the means, the relationships between family functioning and variables are confirmed, except sex and age of adolescents. Nevertheless, from the multiple regression analysis to examine the factors or variables affecting family functioning, it is found that the use of ICT for family communication is the most influential variable. Namely, if families use ICT as communication devices, it can help family functioning to be better or to have better quality. Besides, regarding digital divide in the part of digital skills, it is found that digital skills of both key person playing main roles in the use of ICT in the family and of adolescents themselves have a positive relationship with family functioning. Furthermore, some family characteristics, i.e. the living together with both a father and a mother, extended family, male adolescent, and the key person playing main roles in the use of ICT in the family, are found to be related with family functioning as well.

CHAPTER 7

SUMMARY, DISCUSSION, AND RECOMMENDATION

7.1 Summary

The research entitled, “New Technology Adoption and Factors Affecting Family Functioning,” aims to 1) study the process of ICT adoption as a part of adolescents’ family in Bangkok, 2) to examine the situation of digital divide, family communication, and family functioning of adolescents’ families in Bangkok, and 3) to investigate factors affecting family functioning of adolescents’ families in Bangkok.

The research is both qualitative and quantitative. For qualitative research, phenomenon-approach was conducted with 12 families, composing of families in which most parents graduated with a bachelor’s or a master’s degree, except three families where mothers graduated from the lower secondary education school, vocational college, and diploma. The occupations of the parents are various: government officers, private-company managers and employees, entrepreneurs, merchants, and unemployed, by interviewing adolescents and their fathers or mothers living together in the same families in 2017.

For quantitative research, survey questionnaires were conducted with 947 adolescents who were studying at secondary education in Bangkok. Then, only adolescents who lived together with either their father or mother in the same family in which the key person playing main roles in the use of ICT was either the father or the mother were screened. After that, incomplete questionnaires were sorted out so the remaining samples were 808 adolescents or 808 families and "family" as a unit of analysis in this part.

From the study, it is found that the samples of the qualitative research compose of families in which most parents graduated with a bachelor’s or a master’s degree, except three families where mothers graduated from the lower secondary education school, vocational college, and diploma. The occupations of the parents are various:

government officers, private-company managers and employees, entrepreneurs, merchants, and unemployed.

Regarding the quantitative research, the samples are female (53.6%) more than male (46.4%) adolescents with the average age of 14.6 years old and having 2.03 family members averagely in the same families. The proportion of adolescents in each education level is almost equivalent. On part of their parents, approximately 80% are married. The average age of the fathers is 47.4 years old while the mothers 44.1 years old. 38.7% of the parents, fathers or mothers, earn a diploma degree, and 42.6 % a bachelor's degree. Most parents work in a hireling area (fathers 34.4% and mothers 22.4%), but more mothers are unemployed (17.0%) than fathers (0.8%). The rest of the fathers' occupations are managers/directors (20.8%), professionals (16.0%), merchants (12.8%), government officers (7.9%), and private-company employees (7.3%) while the rest of the mothers' occupations are merchants (16.6%), managers or directors (15.2%), professionals and private-company employees (11.9%) equally, and government officers (5.0%)

From analyzing the overall family characteristics, it is found that two-third of the samples are nuclear families with averagely 4.8 family members. 80% are families in which adolescents live together with both their father and mother. The average monthly income of families is 20,000-59,999 baht the most (25.4%) and the rest incomes are almost equivalent, but 31.7% of families do not know or specify their income. Besides, adolescents report that the person who plays the main roles in the use of ICT in the family is their mother (57.7%).

For the findings responding to the research objectives, it is found as follows:

7.1.1 The process of ICT adoption as a part of the adolescents' families in Bangkok

1) Appropriation or the purchase and adoption in the house

A number of families started their first ICT by buying a desktop computer for work and business entrepreneurship. Later, children participated in using it for their studying. In each adolescent's family, there were several kinds of ICT devices: desktop computers, portable or notebook computers, tablets, mobile phones, and their house was connected to the internet. Even for the families with few ICT devices, they had at

least one computer and one personal mobile phone of each family member. Smartphones with multifunctional capabilities and the internet were the most popular devices nowadays, which were used for information acquisition, communication, entertainment, social media, and online games. Most parents were willing to invest their money to buy various ICT for supporting their children's education and their future investment. Moreover, smartphones were found to provide convenience for parents in using applications, especially Line for contacting family members, and this made the parents feel relieved.

2) Objectification or the placement of ICT in the house

When ICT devices were bought into the house, they were placed at several places, e.g. a living room, study room, and bedrooms, which yielded many technological spaces or spheres in the house. Among all devices, a smartphone(s) became an indispensable part of life that needed to be kept nearby. In some families, technological space was extended to their car as a smartphone(s) is used in a car as well.

3) Incorporation or the use of ICT in daily life

Family members were found to use ICT in their daily activities differently with different purposes from different applications. Smartphones were the major devices of the family for communicating to one another via social media, e.g. Line. Besides, it is found that parents and children use ICT for entertainment purposes together, i.e. watching movies, viewing TV series, playing games, etc. Moreover, families also set Family Line, Parents Line, School Line, etc., and used the school's websites and application for facilitating parents to follow what was going on in school and to follow their children's activities. Therefore, a family's life nowadays is called, "digital lifestyle."

Nevertheless, the use of ICT was not found to enhance adolescents' learning or studying, but also to obstruct their studying. Besides, the use of ICT opened a channel for adolescents to access improper information and online deception. All of these issues were found to be major problems most parents concerned about. Thus, they tried to find ways to manage their children's use of ICT towards their utmost benefits and safety in the online world. Most families tried to adapt their approaches to deal

with and handle their family members' use of ICT by being more flexible and less compulsive. Some shared agreements were loosely established as the family's rules.

4) Conversion or significance and impact of ICT on families

ICT devices were placed at many spaces in the house and used in daily life to respond to family members' satisfaction, necessity, and lifestyle so they had some significance and impact on families. For instance, mobile phones are like an organ of their body, ICT like a teacher, and families like digital families. It was found that children had more ICT skills than their parents. On the other hand, ICT affected their family functioning. As some examples, it reduced a family's getting-together time or decreased family activities. Especially, it turned families towards "social ignoreism" or a phenomenon called, “living together separately.” As a family's life was changed, parents were more worried about looking after their children. Therefore, families had to support one another to survive in the digital era and amidst digital media. Some flexible agreements were settled while some families had to keep following, teaching, and adjusting their dealing methods, including finding other activities to replace their playing with online games or to decrease their social media engagement. Besides, some families consulted with people outside the family.

7.1.2 The Situation of the Possession and the Use of New Technology and Family Communication of Adolescents’ Families in Bangkok.

1) The situation of the possession of new technology in the house

It was found that among all studied digital devices, smartphones are the most popular that almost all families had in their house. 42.8% had more than 5 smartphones. When combining the total digital devices of each family, it was found that the average number is 9.3 devices and each person owned 2.1 devices on average. Besides, 84.7% of the adolescents' families had a connection to the internet in the house. This reflects digital inequality among the studied families in this research.

2) The situation of the use of new technology of adolescents

It was found that 89.2% of adolescents' families used the internet every day. Almost one-third of them used the internet for more than 6 hours daily. From calculating the total hours in one month, it was found that almost half of them used the

internet more than 127 hours per month and 119.9 hours on average. This indicates that adolescents use the internet very often and spend quite a long time on it. The place they used the internet the most was their house, on smartphones, and at school respectively.

Digital skills the adolescents reported that they possessed were the skills of searching for needed information or knowledge, texting via mobile phones, uploading an image, audio, or video files, creating email addresses, problem-solving by themselves when some errors occurred, and downloading and saving music or video files. On the other hand, adolescents reported having the least digital skills in creating filter junk mail settings. Most adolescents' digital skills are at the high level the most, followed by at the moderate and low level respectively.

The most frequent digital activities the adolescents did were listening to music or watching movies, using social media, i.e. Facebook, Twitter, and chats, i.e. Line, Skype respectively. Most adolescents had their digital activities at a moderate level the most, followed by low and high level respectively.

Regarding the digital skills of adolescents' parents, it was found that fathers had digital skills at a very high and high level more than mothers. When comparing the digital skills of adolescents and their parents, most adolescents reported that their parents had lower skills than they the most, followed by at an equal level, and higher-level respectively. Besides, mothers were found to ask for assistance or ask questions about the use of the computer and internet often and regularly more than fathers. Fathers were reported to have higher digital skills than mothers.

Other findings were that almost all adolescents had their mobile phones, most of which were smartphones. They used phones to talk to others approximately 1-3 hours a day the most (approximately 40%), less than 1 hour, and more than 3 hours respectively. Adolescents were found to use YouTube the most, followed by Line, Facebook, and Instagram respectively.

Concerning attitudes towards the internet, most adolescents agreed with the following statements the most, "The internet can help in studying," "The internet can help family members communicate to one another when they are not together," "children can be relaxed and have fun from the use of the internet," and "the internet is a way for making one sociable." When classifying the scores of the parents' attitudes

towards ICT, it was found that most parents expressed rather a negative attitude the most, followed by positive, and rather positive. Furthermore, most parents had similar opinions towards computers and the internet by expressing their slight dislike the most. However, it was found that fathers tended to have more positive opinions towards ICT than mothers.

3) Family communication. It was found that ICT was used “to express love and helpfulness” with the highest mean, followed by “to follow children’s studying,” “to provide useful information responding to the needs of family members,” and “to teach in various subjects and to share their suffering and happiness.” The lowest mean was “to join playing games from applications,” “to talk face-to-face via applications,” and “to follow what or where family members do or are.” Most of the adolescents used ICT for family communication at the low level the most, followed by at the moderate, rather high and high level respectively. In general, it was found that adolescents used the internet or social media to communicate with their mother mainly.

The rules of using ICT that were reported the most were "the family prohibits using a telephone during meals," "the family restricts expenses on telephones," "the family limits time for using the internet and telephones at home," "the family limit length of time for using the internet and telephone at home," and "the family does not allow family members to disclose personal information on the internet and mobile phones." The rules that were reported the least were, "A permission must be given before using the internet," and "parents prohibit closing or locking the door while using the internet." From analyzing the mean of the total numbers of rules obtained from the study, rules at the medium numbers were found the most, followed by large and small numbers of rules.

7.1.3 The Situation of Family Functioning

1) Family functioning consists of 5 categories of family functioning: the cultivation of knowledge and skills, the nurture of well-being, communication about media, the establishment of family relations, and the establishment of relations with external networks. From the findings, it was found that the average score of all 15 family sub-functioning was 28.9 (the range was 1-45). When analyzing the mean of each category of family functioning, "the nurture of well-being" obtained the highest

mean, followed by "the establishment of family relations," "communication about media," "the establishment of relations with external networks," and "the cultivation of skills and knowledge" respectively. As a whole, families in this study were found to perform their family functioning at the moderate level the most, especially in the nurture of family members' well-being and in expressing love and helpfulness. Although this two-family functioning was rated at a moderate level, they were rated higher than other functioning.

2) From the bivariate analysis of family characteristics, digital divide, and family functioning by comparing the means, the relationships between various variables and family functioning were found, except the age and sex of adolescents.

3) From analyzing the factors affecting family functioning of the adolescents' families in Bangkok by multiple regression analysis, the following results were found:

Seven variables were found to have a relationship with family functioning at the statistically significant level and accorded with the hypotheses: the use of ICT for family communication, to have both father and mother living together with the adolescent, digital skills of the person playing main roles in the use of ICT in the family, sex of adolescents, the occupations of the person playing main roles in the use of ICT in the family, digital skills of adolescents, and types of families with the following relationship direction:

1) Adolescents in the families where ICT was used at a higher level for family communication had a higher level of family functioning than those where ICT was used at a lower level.

2) Adolescents living together with their father and mother had a higher level of family functioning than those who lived with either their father or mother.

3) Adolescents in the family where the person playing main roles in the use of ICT in the family had very high digital skills reported to perform a higher level of family functioning than those in the family where the person playing main roles in the use of ICT in the family had low digital skills, but the relationships were not found in the family where the person playing main roles in the use of ICT in the family had moderate and high digital skills, when compared with that with low digital skills.

4) Female adolescents had a lower level of family functioning than male adolescents.

5) Adolescents in the family where the person playing main roles in the use of ICT in the family was unemployed reported to perform a higher level of family functioning than those in the family where the person playing main roles in the use of ICT in the family worked in a hireling area, but the relationships were not found in the family where the person playing main roles in the use of ICT in the family worked in other professions, i.e. managers/directors, professionals, merchants, government officers, and private-company employees, when compared with that working in a hireling area.

6) Adolescents with higher digital skills reported to perform a higher level of family functioning than those with lower digital skills.

7) Adolescents living in an extended family had a higher level of family functioning than those in a nuclear family.

The variables that were found to have no relationship with family functioning and reject the hypotheses were the number of digital devices in the house, the connection to the internet, the amount of adolescents' use of the internet, adolescents' digital activities, the number of family members, the relationship between the person playing main roles in the use of ICT in the family and the adolescent, age and education level of the person playing main roles in the use of ICT in the family, and adolescents' age.

7.2 Discussion

Based on structural functionalism, a family is a sub-institution of society, responsible for producing human and social capital, which is beneficial for societal members in their living and society as a whole. When ICT, as another sub-institution, comes into a family's life, a question if the family functioning of the family institution will be affected and changed is thus raised.

This study is conducted by both quantitative and qualitative research. Regarding the findings from the quantitative research reported by the adolescents, it is found that families in this study still perform their family functioning at a moderate level. When

analyzing family functioning in each category, it is found that family functioning in nurturing the well-being of families obtains the highest mean, followed by family relations establishment, communication about media, the establishment of relations with external networks, and the cultivation of knowledge and skills. Among all categories of family functioning, the nurture of well-being is the only family functioning that is rated at a high level while the rest of family functioning at a moderate level. This indicates that the overall family functioning and family functioning in many categories are dysfunctional, especially in cultivating knowledge and skills, which is the main functioning in producing human capital.

Besides, the establishment of relations with external networks is also another family functioning in creating social capital because a society can exist by the support among community members, i.e. cousins, neighbors, community residents, etc. that are people outside the family since the non-family networks can provide an opportunity in life for people, i.e. some acquaintance can help to find a job or the engagement with the community is useful for the family, i.e. children can play outside safely since the community is safe and supports one another. All of these are what families as the main unit can create for their family members. However, it is remarkable that the mentioned communities are the tangible ones that differ from online or virtual communities, which may not be as real as being presented. Thus, it can be harmful to people who cannot catch up with it. Consequently, the family functioning in communicating about media is important to help family members to have digital literacy and be able to protect themselves from possible crimes, such as identity theft or sexual seduction, which are often heard in the news. To make this family functioning practical, parents or families must have digital literacy as well. In this study, it is found that in adolescents' families, most parents have lower digital skills, i.e. computer, internet, etc. than their children. Thus, the parent's digital skills should be promoted increasingly.

The multiple regression analysis is conducted to examine if the factors affect family functioning. From the analysis, it is found that the use of ICT for family communication is the predictor variable that can explain the variance of family functioning, both the overall and family functioning in each category, the most. This means that the more families use ICT for their family communication, the more family functioning they perform. Thus, ICT can yield a positive effect or benefit for families.

However, though it is found in the qualitative research that every family uses ICT for family communication, more or less, families in this study are found to perform this function at the low level the most. Besides, while Korakot Sanjit (2019) found that social media can enhance the effectiveness of family functioning in various dimensions: teaching, displaying affection and needs for family members to be acknowledged, expressing love and engagement, and collaborative problem-solving and decision-making. Thus, it can say that new technology or ICT can function as a communication channel for a family. In some cases, it also performs equivalence functions, i.e. learning, doing homework, and sex education. On the other hand, many families revealed in the interview that to give time for families in a face-to-face communication is better than mediated communication, which supports the notion of Bryant (1992), saying that family members can bring their skills, knowledge, and mental condition while spending their time doing some activities together, which leads to a positive consequence for a family.

However, the use of ICT for family communication of adolescents is found to be the issues of the expression of love and support the post, followed by following children's studying, providing useful information for the needs of family members, teaching in various matters, and listening for sharing happiness and unhappiness, which does not cover all studied dimensions of the family functioning. Besides, ICT or social media, e.g. Line, that is popular in Thailand also has some limitations in performing some family functioning, i.e. the establishment of relations with external networks and some family functioning that requires time for doing physical activities, i.e. attending religious activities, helping homework, having dinner together, etc.

For the digital divide, the variables of the digital divide at the first stage consist of two variables: the number of ICT devices in the house and the connection to the internet, which reflect the convenience in accessing to information processing and doing digital or ICT activities. From the quantitative research, it is found that the number of ICT devices in the house and the connection to the internet are not related with family functioning; although it is found that to have digital devices and the connection to the internet increases the convenience in using new media, but, on the other hand, it reduces time for family members to get together so members do not interact to one another so much. (Jennings & Wartella, 2004; Wartella & Jennings,

2001) However, new media nowadays tend to be mobile that can be connected to the internet, so members still can have time to communicate with their family so families can still perform their family relations establishment. Furthermore, smartphones can enable adolescents to search for any information without relying on desktop or notebook computers; therefore, it is found that almost all adolescents have their phones connected to the internet and in almost all adolescents' houses, family members have a smartphone as one of their digital devices.

The digital divide at the second stage covers the amount of adolescents' use of the internet, their digital skills and activities, and digital skills of the person playing main roles in the use of ICT in the family. From the study, it is found that the digital skills of the adolescents and the person playing main roles in the use of ICT in the family have a positive relationship with the family functioning at the statistically significant level. It means that adolescents with higher digital skills will perform their family functioning at a higher level as well. The finding thus confirms the hypothesis but in the inverse direction. This can be explained that the higher digital skills adolescents have, the less time they have for doing activities with their families and it is difficult for families to perform their family functioning as wished (Livingstone, 2006). On the other hand, it is found that the digital skills of the person playing main roles in the use of ICT in the family have a positive relationship with family functioning partially; however, such a relationship is found only in the case that the person has very high digital skills only. Thus, to have a person with very high digital skills is important for family functioning.

To have both the father and mother live together with adolescents is another variable that is related to the overall family functioning and family functioning in each category with statistical significance. This confirms the good image and family atmosphere of having all living together that is believed to be a complete family. When all live together, parents can play their roles as a protocol for their children's development in all dimensions: physical, mental, social, and personality, which is supported by the study of Nath Bhuribhatsiri (2018) which found that one of the factors affecting children's being a good and smart person is to have a family where the father and mother live together.

Furthermore, other family characteristics that are found to be related to family functioning with statistical significance are "extended family, the occupation of the person playing main roles in the use of ICT in the family, and female adolescents. The finding confirms the hypothesis relating to the type of family. Namely, adolescents living in an extended family are reported to have higher family functioning. For the occupation variable, it is found that only the unemployed key person is found to be related to family functioning, compared with that in the hireling area. For the sex variable, the finding rejects the hypothesis since it is found that female adolescents have lower family functioning than males. The findings of the relationship between family characteristics and family functioning accord with the concept of Weeks (2005), which states that family characteristics affect family members' chance of life or family functioning.

Other variables that are not found to have a relationship with family functioning are the amount of adolescents' use of the internet, adolescents' digital activities, the number of family members, the relationship between the person playing main roles in the use of ICT in the family and the adolescent, age and education level of the person playing main roles in the use of ICT in the family.

Regarding the situation of the possession of new technology in adolescents' families, one of the overall findings is that adolescents as digital natives are often perceived to be identical. Namely, they are perceived to use digital devices regularly in their daily life and have some levels of digital skills. The finding of this study reflects that in spite of their commonalities in using the internet, computer, and mobile phones at the top level of the country, adolescents in Bangkok are still different in the average number of digital devices in the house, the amount of internet use, digital skills, and activities.

From the qualitative findings of this study obtained from interviews with either the father or mother, and the adolescent in the same family, it is found that families can still perform their functioning, but not so effectively as they should. In other words, their functioning might be dysfunctional because the use of ICT in the family reduces a family's time to do activities together in spite of their co-living. The family activities are ignored but members pay more attention to ICT, especially smartphones. Although, from this study, it is found that most families accept the benefits gained from the use of

ICT: for working, studying, and communicating among family members and between parents and school. On the other hand, parents have to spend their time dealing with their children's use of ICT; thus, it causes them to worry and anxiety, i.e. easy access to improper information, internet or cybercrimes, violation of privacy, and online-game addiction, etc.

The process of domesticizing ICT adoption as a part of a family is dynamic since innovations or new inputs or sub-institutions can occur continuously in a society. Once a family opens an opportunity to adopt such things into a private sphere because of some expected benefits, some changes will surely occur and require some coping methods to let the family survive and have well-being by searching for some advice from external sources. For instance, families have to adjust family activities (i.e. to pray, go to the temple, cook, do household work, etc.) to decrease their children's time on the use of ICT. One interesting remark is what parents give in their interview that ICT cannot replace time for their children in cultivating knowledge and life skills and in expressing their love and support for their family members. Face-to-face family communication is still the best communication channel and in reality, parents cannot follow their children all the time or know what their children have or do. Therefore, the most important guideline is to teach them and equip them with conscious awareness for protecting themselves.

Besides, another sub-institution that performs as a mechanism in calling for students' attention is academic institutions, but sometimes they let another sub-institution like ICT interfere with their function in many ways. This is not wrong since ICT can also facilitate educational systems, especially helping in searching for information and solving the problems of a shortage of educational personnel in many schools. Still, ICT might be used in the wrong way or with wrong purposes, such as to find exam questions and solutions on the internet. Thus, the following question is how schools and teachers provide knowledge and concepts for their students in searching for information and using it for educational purposes: studying, learning, doing homework, and reports, which involves the concept of media literacy, especially how to evaluate the correctness and credibility of the information found. This is an important issue in cultivating adolescents who are called, "digital natives" to know how

to process and use information in the right way under the context of fraud-news and prosumers society

Finally, in summary, when new technology or ICT is adopted into the family, it can bring about both positive and negative changes in family functioning. The finding supports the media ecology of McLuhan that explains the impact or influence of digital technology on individuals and society. However, it is not the number of digital devices nor the connection to the internet that influences family functioning. Instead, adolescents' and their parents' digital skills are found to be predictor variables of family functioning with statistical significance. This indicates that the use of ICT for family communication can support family functioning. Tapscott (1998), the author of "N-Gen and the Family," in the book Growing Up Digital the Rise of the Net Generation, expresses his idea that it is useless for parents to be strict or control their children's use of ICT too much since it will worsen the family relations or turn the relationship to be negative. He further proposes the concept of "open family," which means a family with an open relationship based on a focus on listening, trust, acceptance of their children's culture, manifest attention on ICT benefits, and learning from children.

7.3 Research Limitation

1) This study is cross-sectional research of one-time data collection; thus, it cannot indicate some changes in the studied phenomenon over time.

2) Adolescents who are samples of this study are students in the secondary formal education; therefore, the findings cannot represent all adolescents since there are a large number of adolescents beyond this study, i.e. students of non-formal education or vocational schools, etc.

3) The information on the family functioning obtained from this study is reflected or perceived by adolescents only. If the same questions are responded by other family members, different information or findings may be obtained.

7.4 Recommendation

7.4.1 Recommendations for application

7.4.1.1 For practical application

New media is not the first media in the world that has an impact on society, communities, and families. For instance, past studies paid high attention to investigate how televisions yielded an impact on children and adolescents. However, for new media, it is equipped with relatively more complete and complicated functions, which can cause a severe impact on society. From the qualitative research, it is found that family systems are dynamic and adaptive to perform varying functions responding to changes in each era as McLuhan says, "Technologies determine people." Adolescents nowadays represent people of a new generation who are skillful in ICT while their parents of different generations have different attitudes and learning. Still, parents must catch up with them and try to find ways to cope with changes. Since a family is an important unit in producing human resources for the country, it should not be neglected to support itself. On the contrary, other sub-systems in the society, i.e. concerned ministries, mass media institutions, website and news creators, and business section that produce all kinds of applications, should help to release a family's burden and express their responsibilities for the society as well as to produce works for developing human capital without concerning about profits only.

7.4.1.2 Application in the academic circle.

Academic institutions should establish an increased body of knowledge of ICT. For instance, smartphones are the ICT that affects family life predominantly; thus, all projects or programs related to ICT and families under the support of the government should be evaluated to follow their consequences and impact of the programs or projects. Besides, education institutions in the field of communication and other related fields should mobilize private and business sectors to produce applications with a sense of responsibility for the society and stimulate government sectors to play a role in preventing online risks and harms to the society. Besides, there should be some lessons for training or publicizing for the general public to learn more about technology and media literacy for preventing rather than solving the problems.

7.4.2 Recommendations for further studies

7.4.2.1 This research focuses on families with adolescents studying at the secondary education level. However, families are various, so other types of families, i.e. families with a single mother or father, families composing of different generations, etc. should be studied.

7.4.2.2 Similarly, there are also different types of adolescents, i.e. adolescents in other formal education schools, in non-formal education schools, etc. Thus, these kinds of adolescents should be studied as well.

7.4.2.3 Normally, there are several family members in a family, but the quantitative research of this study emphasizes only adolescents, excluding their parents. Therefore, future studies should be conducted on other family members to compare with the findings from this research to get a more complete portrayal of the family functioning of the country.

7.4.2.4 Family functioning can be studied and measured by different methods and tools, such as the indicators of family strength, etc. Other different measurements and methods should be used and compared with the findings of this study.

7.4.2.5 This study covers several kinds of ICT. In the future, more specific ICT, such as a smartphone, which is one of the most popular new technology and causes a high impact on families, should be explored in more detail.

7.4.2.6 Future studies should be conducted in other areas where the use of ICT is less or low, i.e. in rural areas or other provinces.

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APPENDIX

APPENDIX A

Question guidelines for interviewing with adolescents

Family: ICT, communication, and family functioning

Question guidelines for interviewing with adolescents

Family: ICT, communication, and family functioning

Number of the interviewee ----------

✪ General information of the adolescent: age, education level, numbers of siblings, numbers of close friends, and GPA.

▪ **The use of ICT of the student and his or her family**

- What kinds of ICT devices do they have at home? (i.e. desktop computer, notebook computer, tablet, old-style mobile phone, smartphone, home telephone, etc.) And how many?
- Where are these devices placed at home? To whom do they belong to? Does the student have his or her own? When did he or she and the family start using these devices?
- Does your house have an internet connection to the house? What kind? Why does the family have or have no connection to the internet?
- How can he or she use these devices? Who taught him or her? And since when?
- To what extent does the student use a computer, the internet, and mobile phone? How often? How many hours per day? Mostly, where does he or she use them?
- For what kind of activities does he or she use them? And how often? –
- Mostly, where or which room does the student use these ICTs (computer, internet, mobile phone)
- Mostly, what kind of program or application does the student use?
- How or for what kind of activities do other family members, e.g. parents, etc. use a computer, the internet and mobile phone?
- Do they use ICT jointly? Such as between the parents and children, among sisters or brothers? Do the parents watch together or sit nearby?
- How skillful is each family member in using ICT? Who has the best skills? Between the parents and children, who are better?
- What are the functions and dysfunctions of ICT? How do you feel about ICT, especially its impact on the family?
- Why do you use those ICT devices?

- Is your family worried about family members' use of ICT (including mobile phones)? What is the family's concern?
- What does the family do about family members' use of ICT in and outside the house?
- Are any rules or regulations established? Who plays the role of setting all rules? Are the rules commonly agreed or compulsive? Is there any problem or conflict as a consequence?
- Do family members obey or comply with those rules?
- Is there any group Line in the family? How many groups are you a member of?
- What do you share with your friends on social media?
- Have you ever experienced any cyberbullying? Have you ever found any keyboard thugs? Have you ever got any problem in school?

▪ **Family functioning and the impact of ICT**

- What is the family's daily life during weekdays and weekends?
- How do family members communicate with one another? Do ICT devices help? How?
- What do your parents teach about the use of ICT?
- Who is responsible the most for the family's well-being and your studying? Please give reasons.
- Who plays the main roles in the use of ICT in the family, i.e. making buying decisions, establishing rules of using ICT in the family? Please give reasons.
- What is your family worried the most about you? What do you complain about the most? Please give reasons.
- What happens since the adoption of the computer or internet in the family? (i.e. family time for being or doing activities together, children's study, etc.)

-Do you think if ICT affects your family life? How?

Thank you very much for your time in replying to all questions

APPENDIX B

Question guidelines for interviewing with parents

Family: ICT, communication, and family functioning

Question guidelines for interviewing with parents

Family: ICT, communication, and family functioning

Number of the interviewee ----------

✪ General information of parents: age, marital status, education level, occupation, income, numbers of children, numbers of household members (who are they?).

▪ **Family functioning**

- What are families and what are family functions?
- What are good or strong families?
- How do your family members communicate? Do you use devices or face to face? Which one is better?
- At home, who is the key person playing main role in taking care of children's well-being and study? And who is the key person playing main role in the use of ICT in the family, i.e. making decision to buy devices or setting up ICT rules?
- What is the most concerned issue the family has for their children? Other issues? Why?

✪ General information of households: Number of ICT devices, i.e. personal computers, mobile phones, internet connection, rooms that devices are placed, owners of each device and time begin owning the devices.

▪ **The use of ICT of children and the family**

- To what extent do children use a computer, the Internet, and mobile phone? How often? How many hours per day? For what purposes?
- How about other family members? Do they use a computer, the Internet, and mobile phone? How often? For what purposes? Do they use devices together, i.e. parents and children?
- How skillful is each family member in using ICT? Who has the best skills? Between the parents and children, who are better?
- What are the benefits and threats of ICT? Why do you purchase them for your children and family members?

- Is your family worried about family members' use of ICT (including mobile phones)? What is the family's concern?
- What does the family do about family members' use of ICT in and outside the house?
- How can the family be confident that children are safe or get full benefits from ICT? Does the family check devices or programs that children use?
- How do you monitor children's ICT uses? Are any rules or regulations established? Who is the person with a great role in setting up rules? Or do family members discuss first? Is there any problem or conflict as a consequence?

▪ **ICT adoption and the impact of ICT on the family**

- Do you think that ICT have an impact on families? How? Or How is the family with ICT?
- Are families with great number of devices good or not good? Have you ever seen or heard about family problems due to ICT? How?
- What happens since the adoption of the computer or internet in the family? (i.e. family time for being or doing activities together, children's study, etc.)

Thank you very much for your time in replying to all questions

APPENDIX C

Interview Questions for Adolescents

No of questionnaire …….

Questionnaire

Topic: "Digital Divide and Family Communication"

School……..

Secondary education level……..

Information for Research Participants

This questionnaire is a partial fulfillment of the requirements for the degree of Doctor of Philosophy, National Institute of Development Administration (NIDA) of Mrs. Achara Entz. The research is aimed to study a family situation and the use of ICT and new technologies, i.e. computer, internet, and smartphones in adolescents' families in Bangkok and to explore if and how the use of ICT and communication technology is related to adolescents' family communication.

This study is quantitative, collecting data from 808 adolescents who are studying in the lower and upper secondary education level of government and private schools in 2017 in Bangkok. The questionnaire, of 11 pages comprising questions about students and their family, is self-administered in a classroom, taking about 30 minutes.

Participation in this study is voluntary. Participants have a right to deny their participation and are free to reject answering any question or to stop their participation immediately at any time they wish without having to give any explanations and without affecting their academic achievement in any way.

The collected information from questionnaires will be kept as confidential and no names nor information referring to the respondents of this questionnaire will be revealed in the report.

I am pleased to respond to this questionnaire by myself ☐ yes ☐ no

Name of the collector……...date….month……year……

This questionnaire has 11 pages, composing of three parts:

Part 1: General information

Part 2: Questions about the use of ICT and communication technologies, e.g. computer, internet, smartphone, etc. , of students and other family members.

Part 3: Family communication

Directions: Choose the most accurate answer by marking X into ☐ or fill a statement in the provided space.

Part 1: General information

1.1 General information of the student

1. Sex ☐ 1) male ☐ 2) female
2. Date of Birth Month…….. Year…….. age…….. years
3. Numbers of siblings including you. Number(s)……
4. Domicile by birth or hometown
   ☐ 1) Bangkok ☐ 2) other provinces (please specify)……..
5. While studying, the place where you live regularly
   ☐ 1) at your own home or condominium
   ☐ 2) a rent house/condo/apartment/ flat
   ☐ 3) general dormitory (alone or with a friend(s)
   ☐ 4) the school's dormitory/ boarding school
6. In your house (which can be your own home/condo, rent house/condo/apartment/flat, but is where you live with your family), how many members living with you regularly (including yourself)? Numbers……

7) In your family, who lives with you regularly?
   ☐ 1) father ☐ 2) mother ☐ 3) elder sister or brother (single)
   ☐ 4) younger sister or brother ☐5) elder sister or brother (married)
   ☐ 6) brother-in-law/ sister-in-law ☐7) nephew/niece
   ☐ 8) grandfather(father's father)

☐ 9) grandmother (father's mother)

☐ 10) grandfather (mother's father)

☐ 11) grandmother (mother's mother)

☐ 12) other relatives or cousins (please specify)……

☐ 13) other people who are not a family member (please specify)

8) Your grade point average (GPA) up to the first semester of 2017) GPA……

9) the number of a close or intimate friend (s)…….

1.2 General information about the student's parents.

10. Do your parents live together as a husband and wife?

☐ 1) No, they are separated

☐ 2) No, either your father or mother has passed away

☐ 3) Yes, they are still living together

11) How old is your father? Age……. Years. ☐ Deceased

12) What is your father's highest education level?

☐ 1) Illiterate ☐ 2) grade 1-6 or 1-7 ☐ 3) grade 7-9

☐ 4) grade 10-12 or Vocational college

☐ 5) high vocational college or diploma

☐ 6) a bachelor's degree ☐7) higher than a bachelor's degree

☐ 8) others (please specify) ☐9) deceased

13) What is your father's main occupation or profession?

☐ 1) a manager or director

☐ 2) a practitioner, i.e. medical, instructor, nurse, lawyer

☐ 3) a craft man, i.e. wood, beauty, sewing, etc.

☐ 4) clerk, secretary

☐ 5) farm owner or family's farm

☐ 6) a service provider, i.e. food, cleaning, cooking, etc.

☐ 7) business/ commerce

☐ 8) hireling in agriculture, industry, service, or general work

☐ 9) others (please specify)……..

☐10) not work/ unemployed because……..

☐11) passed away

14) How old is your mother? Age……. Years. ☐ Passed away

15) What is your mother's highest education level?

☐ 1) Illiterate ☐ 2) grade 1-6 or 1-7 ☐ 3) grade 7-9

☐ 4) grade 10-12 or Vocational college

☐ 5) high vocational college or diploma

☐ 6) a bachelor's degree

☐ 7) higher than a bachelor's degree

☐ 8) others (please specify)

☐ 9) passed away

16) What is your mother's main occupation or profession?

☐ 1) a manager or director

☐ 2) a practitioner, i.e. medical, instructor, nurse, lawyer

☐ 3) a craft man, i.e. wood, beauty, sewing, etc.

☐ 4) clerk, secretary

☐ 5) farm owner or family's farm

☐ 6) a service provider, i.e. food, cleaning, cooking, etc.

☐ 7) business/ commerce

☐ 8) hireling in agriculture, industry, service, or general work

☐ 9) others (please specify)……..

☐10) not work/ unemployed because……..

☐11) passed away

17) The total average monthly income of the family (of every family members)

☐ 1) less than 10,000 baht ☐ 2) 10,000 – 19,999 baht

☐ 3) 20,000 – 39,999 baht ☐ 4) 40,000 – 59,999 baht

☐ 5) 60,000 – 79,999 baht ☐ 6) 80,000 – 99,999 baht

☐ 7) 100,000-199,999 baht ☐ 8) 200,000 – 299,999 baht

☐ 9) 300,000-399,999 baht ☐10) more than 400,000 baht

☐11) unknown

18) In your family, who takes care of you the most in terms of living and learning conditions?

☐1) father ☐2) mother ☐3) others (please specify)……

1.3 Information about the possession of ICT and communication technologies in the house

Direction: ICT means all kinds of information and communication devices and technologies, i.e. laptops, notebooks, tablets, mobile phones, and Smartphones

19. How many pieces of the following do you have in your house?

☐ 1) ……. desktop computer(s)

☐ 2) ……..notebook computer(s)

☐ 3) ……..tablet(s)

☐ 4) …… mobile phone(s)

☐ 5) ……smartphone (s)

☐ 6) …… home phone(s)

☐ 7) others (Please specify) …….

20. Do you install the internet service at your house?

☐ 1) yes ☐ 2) no (please jump to question no. 23)

21. What type and of which speed of internet do you use at home?

☐ 1) dial up the internet of 56 kbps

☐ 2) high-speed internet, either fixed broadband or LAN

☐ 3) WiFi internet

☐ 4) others (please specify)……

☐ 5) not sure

☐ 6) unknown

22. How long have you installed internet service at your house?

☐ 1) less than 6 months ☐ 2) 6 months – 1 year

☐ 3) more than 1 year but less than 2 years ☐4) 2 years up.

23. Did your house install a protection program from access to websites with improper content?

☐ 1) yes ☐2) no

Part 2 Information about the use of ICT and new technologies of students and other family members during the past six months.

1.To what extent have you used the internet during the past six months?

☐ 1) Everyday ☐ 2) 5-6 days a week ☐ 3) 1-4 days a week

☐ 4) 1-3 days a month

☐ 5) others (please specify)……

☐ 6) never use (please jump to the Question no. 4)

2. How many hours per day do you use the internet approximately during the past six months?

☐ 1) less than or equal to 1 hour ☐ 2) more than 1 hour- 2 hours

☐ 3) more than 2 hour- 3 hours ☐ 4) more than 3 hour- 4 hours

☐ 5) more than 4 hour- 5 hours ☐ 6) more than 5 hour- 6 hours

☐ 7) more than 6 hours

☐8) others (please specify)……

3. Mostly, where do you use the internet during the past six months? (<u>If more than one place, please put the number 1 up to the last number in order of frequencies.)</u>

☐ 1) home ☐ 2) school ☐ 3) internet shop

☐ 4) a friend's house or residence

☐ 5) a cousin's house or residence

☐ 6) an acquaintance's house or residence

☐ 7) mobile phone

☐ 8) others (please specify)……..

4. Do you have your mobile phone?

☐ 1) yes, an old model mobile phone ☐ 2) yes, a smartphone

☐ 3) no (please jump to the Question no. 8)

5. How many hours per day on average do you use a mobile phone in communicating with others?

☐ 1) less than 1 hour ☐ 2) 1-2 hours

☐ 3) more than 2 hours-3 hours ☐ 4) more than 3 hours

6. Do you use a mobile phone connecting to the internet?

☐ 1) yes ☐ 2) no |

☐ 3) my mobile phone cannot be connected to the internet.

7. Mostly, where do you use a mobile phone at home?

☐ 1) bedroom ☐ 2) recreation room ☐ 3) study room

☐ 4) living room or guest room

☐ 5) others (please specify)……..

Direction. Please mark X in the column that fits or accords with your usage behavior of ICT, including new technologies.

8. How often do you use the following programs or applications during the past six months?

Program or application	No use	The least	Seldom	often	Most often
1) Facebook					
2) WhatsApp					
3) Line					
4) Twitter					
5) Instagram					
6) YouTube					
7) Others (please specify)……..					

9. During the past six months, how often do you use a computer/internet/ mobile phone to do the following activities?

Activity	Never	Seldom	Often	Every day
1) Sending and receiving emails				
2) Chatroom, i.e. Line, Skype				
3) Websites for searching for information/knowledge				
4) Game online				
5) Web forum, i.e. pantip.com				
6) Uploading/sharing texts/images				
7) Download programs				
8) Listening to songs or music /watching movies				
9) Social media, i.e. Facebook, Twitter				
10) Working classroom assignments				

10. Can you do the following by using a computer/internet/mobile phone?

What I can do	Can	cannot
1) Search for needed information or knowledge		
2) Send a short message via mobile phone		
3) Solve problems by yourself when facing a mistake/error/problem		
4) Create an email address		
5) Download and save songs or video files, e.g. MP3, AVI, MP4		
6) Customize spam filter settings or filter settings of unwanted advertisements, i.e. spam, junk mail		
7) Protect or remove computer virus		
8) Upload images/song/video		
9) Back up or transfer files through cloud service, i.e. Skydrive, Dropbox		

Direction: Please mark X in the column that fits or accords with your opinions on the following statements the most.

11. To what extent do you agree or disagree with the following statements?

Statement	Disagree the most	disagree	agree	Agree the most
1) The internet can enhance learning.				
2) The internet can help family members to communicate when they are not together				
3) The internet is a channel to get along with friends				
4) Most people are too worried about adults' exploitation over children on the internet				
5) Too frequent use of the internet can cause children's isolation from others.				

6) To spend time on the internet is unsafe for children				
7) A family's too much screen time on the internet can lessen members' conversation.				
8) The internet can interfere with parents' teaching on desired values and beliefs for their children.				
9) The internet makes children alert.				
10) Children can be recreated and have fun using the internet.				

12. Who is the person who plays the main role of controlling the use of ICT, including new technologies, in your family, i.e. purchase decision-making, rules of using ICT and new technologies, etc?

☐ 1) father ☐ 2) mother

☐ 3) others (please specify)……

13. Do you think to what extent or to which level your father is capable of using a computer and the internet?

☐ 1) not at all ☐ 2) at a low level ☐ 3) at a moderate level

☐ 4) at a good level ☐ 5) at a very good level

14. Compared with you, to what extent or to which level your father is capable of using a computer and the internet?

☐ 1) at a lower level ☐ 2) at the same level ☐ 3) at a higher level

15. Has your father ever asked you any questions or asked for any assistance on how to use a computer or the internet?

☐ 1) never ☐ 2) seldom ☐ 3) often ☐ 4) always

16. Do you think what is your father's attitude on the computer and the internet?

☐ 1) negative attitude with a belief that they are not good and useless

☐ 2) neutral attitude

☐ 3) little positive attitude with a belief that they are slightly good and useful

☐ 4) highly positive attitude with a belief that they are very good and useful

17. Do you think to what extent or to which level your father is capable of using a computer and the internet?

☐1) not at all ☐2) at a low level ☐3) at a moderate level

☐4) at a good level ☐5) at a very good level

18. Compared with you, to what extent or to which level your mother is capable of using a computer and the internet?

☐1) at a lower level ☐2) at the same level ☐ 3) at a higher level

19. Has your mother ever asked you any questions or asked for any assistance of how to use a computer or the internet?

☐1) never ☐2) seldom ☐3) often ☐4) always

20. Do you think what is your mother's attitude on the computer and the internet?

☐1) negative attitude with a belief that they are not good and useless

☐2) neutral attitude

☐3) little positive attitude with a belief that they are slightly good and useful

☐4) highly positive attitude with a belief that they are very good and useful

Part 3: Family Communication

Direction. Please mark X in the column that fits or accords with what your family does the most during the past six months.

1. The functioning of a family in creating human capital and social capital during the past six months

Statement	Never	Seldom (1-3 times/week)	Almost every day (4-6 days/week)	Everyday /regularly
1) Family members facilitate your studying				
2) Family members help you to do other activities besides studying				

3) Family members take care of you when you are sick				
4) Family members take care of your sanitary habits				
5) Family members talk about information from various media creatively.				
6) Family members teach or advise how to use the internet or to access websites				
7) Your family openly talks and agrees about the rules of the house.				
8) Family members help to do homework				
9) Family members do religious activities together				
10) Family members express their love and helpfulness for one another				
11) Family members have an opportunity to join doing activities altogether.				
12) Family members solve problems or conflicts rationally.				

13) Your family plays a part in supporting neighbors and communities				
14) Your family supports cousins/relatives living apart when they have problems.				
15) Family members have an opportunity to have dinner together.				

2. Rules or regulations of using ICT, including communication technologies, during the past six months

Direction. Please mark X in the column that fits or accords with what your family does concerning the use of the computer, internet, and mobile phone the most during the past six months.

What your family does	yes	no
1) Your family restricts when you can use the internet or a phone in the house.		
2) Your family restricts the length of time you can use the internet or a phone in the house.		
3) Your family does not restrict when you can use the internet or phone out of the house.		
4) Your family does not restrict the length of time you can use the internet or phone out of the house.		
5) Your parents can check the websites to which you or your siblings access.		
6) Your parents forbid you and your siblings to close or lock the door while using the internet.		

7) Your family forbids family members to disclose personal information on the internet and mobile phone.		
8) You and your siblings do not have to ask for permission before using the internet.		
9) Your family does not limit your expenses on the mobile-phone use		
10) Your family does not allow using a phone during meals.		

3. To what extent do your parents trust in your usage of a computer/ the internet/ a mobile phone?
   ☐1) Never ☐2) little ☐3) fairly ☐4) highly
4. Do your parents know what kinds of activities you do during your use of the computer/internet/mobile phone?
   ☐ 1)Never ☐2) little ☐3) fairly ☐4) everything
5. How often do you have a conflict with your parents about your use of the computer/internet/mobile phone?
   ☐ 1) Never ☐2) seldom ☐ 3) often ☐4) always
6. The use of ICT, including new technologies, for family communication during the past six months.

Direction. Please mark X in the column that fits or accords with the use of the computer/internet/mobile phone/social media in your family for family communication the most during the past six months

the use of the computer/internet/mobile phone/social media in your family	Never	Seldom (1-3 times/week)	Almost every day (4-6 days/week)	Every day / regularly
1) Chat about daily life				
2) Share family members' stories, either text or image				

3) Non face-to-face Talk on phone via applications				
4) Face-to-face talk on the phone via applications				
5) Follow what family members do or where they are				
6) Send and receive audio/video clips for songs for entertainment and amusement.				
7) Join playing games in applications.				
8) Teach on various subjects				
9) Exchange ideas				
10) Display love, concern, and helpfulness				
11) Conciliate conflicts and create common understandings				
12) Provide useful information needed by family members.				
13) Discuss for finding solutions acknowledged and agreed by all members.				
14) Follow your studying				
15) Listen for sharing the joy and suffering of family members				

7. Mostly, with whom do you use the internet or social media during the past six months? (If more than one person, please put the number 1 up to the last number according to the order of frequencies)
   ☐1)Father ☐2) mother ☐3) siblings ☐4) others (please specify)……

…..Thank you very much for your time in replying to this questionnaire….

BIOGRAPHY

NAME	Achara Entz
ACADEMIC BACKGROUND	B.A. in Psychology, Thammasat University, Bangkok, Thailand in 1983 M.A. in Development Communication, Chulalongkorn University, Bangkok, Thailand in 1988 M.S. in Public Health (Biostatistics), University of Hawaii at Manoa, USA in 1993
WORK EXPERIENCE	Researcher, Institute of Population Studies, Chulalongkorn University, Bangkok, Thailand, 1985-1994 Instructor, College of Population Studies, Chulalongkorn University, Bangkok, Thailand, 1994-2000 Assistant Professor, College of Population Studies, Chulalongkorn University, Bangkok, Thailand, 2000-2015