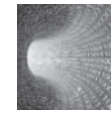

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The dynamic relationship between East Asian adolescents' use of the internet and their use of other media

Joo-Young Jung
International Christian University, Japan

Wan-Ying Lin
City University of Hong Kong, Hong Kong SAR

Yong-Chan Kim
Yonsei University, Korea

Abstract

We examined the internet connectedness of adolescents in relation to their use of traditional media, including television, radio and newspapers, as well as their goals when going online. The study was based on a survey of 1874 adolescents in five East Asian cities – Hong Kong, Singapore, Seoul, Taipei and Tokyo. We first identify three types of internet connectedness: communication/entertainment; expression/participation; and information/research. We then examine how each type of internet connectedness relates to adolescents' use of other media. Finally, we examine how different types of internet connectedness and other media uses are shaped by 'internet-related goals'. Our research results indicate that the use of the internet together with other media such as television, radio and newspapers differs depending on the type of internet connectedness, and that adolescents use not only the internet but other types of media to fulfill specific internet-related goals.

Keywords

adolescent, East Asia, internet connectedness, internet use, media displacement, media system dependency theory, media use

Corresponding author:
Yong-Chan Kim, Yonsei University, 50 Yonsei-ro, Seodaemun-gu, Seoul 120-749, Korea
Email: yongckim@yonsei.ac.kr

Adolescents are the most active and innovative users of new communication technologies (Jones and Fox, 2009; Rainie, 2009). Adolescents today are growing up with the internet, and the internet has become a central medium in their everyday lives. The internet is used by adolescents as a tool to communicate, to seek educational resources and other information, to shop, to access entertainment and to achieve various other important goals. Many studies have examined different aspects of adolescents' internet use (e.g. La Ferle et al., 2000; Lenhart, 2009), but few studies have researched their internet use in the context of other media.

This study presents an in-depth analysis of East Asian adolescents' internet connectedness with respect to different goals and examines the dynamic relationships between internet connectedness and connectedness to other traditional media, in this case, television, radio and newspapers. When examining the relationship between the internet and other media, many past studies treated the internet as a medium with fixed properties and examined whether internet use displaces time spent with other traditional media (e.g. Nie and Hillygus, 2002; Pronovost, 2002). However, the internet is distinguished from other media because it is a network of networks that connects individuals to information, people, technologies and services (Dutton, 1999; Jones, 1998; Metzger, 2009; Walther et al., 2005). The interactive and flexible nature of the internet enables individuals to be more active users. Compared to the use of other media, individuals can now engage in diverse types of activities on the internet and construct different meanings of the internet in their everyday lives.

In this article, we first categorize the ways in which East Asian adolescents' use the internet. We then examine how each type of internet connectedness is related to the use of other media (television, radio and newspapers). Finally, we analyze the relationship between the goals for using the internet and the types of internet and other media uses.

The current study focuses on adolescents living in five cities in East Asia: Hong Kong, Seoul, Singapore, Taipei and Tokyo. These East Asian cities are among the most connected places in the world (Internet World Stats, 2012). For example, Seoul has the world's highest broadband penetration rate of 95% of all households and has many internet cafés, which allow adolescents in Seoul to enjoy fast internet connections (Anderson, 2009). Singapore and Taiwan are also ranked in the top five countries, with 88% and 81% broadband penetration rates, respectively (Anderson, 2008). In Japan, the majority of adolescents have used the internet with their mobile phones, diversifying the connection and usage types (Ministry of Internal Affairs and Communications, 2007). These East Asian cities also share several common factors. For example, they have benefited from national policies that promote the adoption of new communication technologies (Kuznets, 1988; Nishigaki et al., 2001), and they have relatively low rates of inequality (Fontana and Srivastava, 2009; Tai, 2010). Also, scholars have pointed out that communication practices in the Asian region are likely to be distinguished from those of other regions (Dissanayake, 2009; Kuo and Chew, 2009). The social, political, and technological conditions in East Asian cities create conditions that are conducive for adolescents to connect to new communication technologies. What media they use and how they approach them in the context of internet use for different goals is the particular focus of the current study.

Literature review and hypothesis

Adolescents' use of the internet and other media

Adolescents' use of the internet has been examined in many recent studies in different social contexts (Jung et al., 2005; Lenhart, 2009; Lin et al., 2010; Strasburger et al., 2009). Ninety-three percent of adolescents aged 12–17 in the United Sates were online in 2009, which was the highest penetration rate among all age groups (Jones and Fox, 2009). The adolescents in the United States were the most likely group to use the internet for entertainment and communication (Jones and Fox, 2009). In East Asia, the internet penetration of adolescents in Korea, Taiwan and Singapore had already reached 90% by the year 2001 (Jung et al., 2005).

Despite the increasing attention given to adolescents' internet uses, not many studies have examined their types of internet use in the context of other media. In other words, many studies have focused exclusively on internet use without examining adolescents' use of other media, such as television, radio or newspapers, which may remain important in their everyday lives. Among the studies that examined adolescents' use of the internet and other media, Bonfadelli headed a study that examined the use of new and old media by adolescents in Switzerland (Bonfadelli et al., 2007). They found that Swiss adolescents not only enjoyed going online but also enjoyed connecting to media contents such as globalized youth television, music programs and youth magazines (Bonfadelli et al., 2007). In their in-depth empirical research of children and teens in home settings, Livingstone and her colleagues offered a rich picture of how adolescents in European countries negotiated their connections to different media in their everyday lives (Livingstone, 2009; Livingstone and Bovill, 2001).

Other studies have more directly addressed the issue of how internet use was related to the use of other media in adolescents' lives. In their studies of children in Singapore, Lee and Kuo (2002) found that the increased use of the internet resulted in a drop in television viewing time. However, this was associated with an increase in newspaper reading and radio listening as well. The authors explained that children's use of the internet was likely to motivate their curiosity in various subjects, making them search for more information on the subjects in newspapers. Listening to the radio also increased with the increased use of the internet, as Lee and Kou explained, because children might listen to the radio while engaging in other activities, such as online surfing. In a study of Korean adolescents' media use and political engagement, Kim and Kim (2007) assessed the relationships between the motivation for using new and old media and adolescents' degrees of political engagement. The authors found that guidance and social utility motivation promoted adolescents' political engagement on the internet.

The internet and other media

Whether a new medium displaces or complements existing forms of media has been a recurring topic for media researchers with the introduction of a new form of medium (Grotta and Newsom, 1982; Henke and Donohue, 1989; Leung and Wei, 1999). In 1959, Wilbur Schramm and his colleagues examined the influence of television as a new

medium at the time on children's use of other older media such as radio, movies and books (Schramm et al., 1961). By comparing two towns in Canada, one of which did not have access to television, they found that those who watched television spent less time listening to the radio, watched fewer movies, and read fewer comic books than those who had not used television. Newell (2007) revisited the study led by Schramm and conducted research in the same town. He found that the use of the radio did not decrease in 2000 when compared to the usage level in 1959. The use of the radio increased with the use of other media, such as television and computers.

With regard to the relationship between the internet and older forms of media, many studies have found a decreased use of older media with the introduction of the internet (Dimmick et al., 2004; Kayany and Yelsma, 2000; Nie and Hillygus, 2002; Noack, 1998). For example, Dimmick and his colleagues (2004) found that internet use was associated with a decreased use of television and newspapers for obtaining daily news information.

Other studies presented complementary relationships between the internet and older media (Anderson, 2008; Dutta-Bergman, 2004; Lee et al., 2005; Newell et al., 2008; Stempel et al., 2000; Tsao and Sibley, 2004). Newell et al. (2008) found that increased use of the internet (especially email) was associated with increased or steady consumption of television, radio and newspapers. In their studies of adolescents' use of different media, including radio, television, internet, video games and telephones, McClung et al. (2007) found that listening to the radio was positively associated with internet use but negatively associated with playing video games.

Studies utilizing a uses and gratifications approach have examined the displacement effects of new media by comparing the most important functions of new and old media in individual users' lives (Choi et al., 2009; Dutta-Bergman, 2004; Feaster, 2009; McClung et al., 2007; Muhtaseb and Frey, 2008). If the functions between the new and old types of media are similar, the new media are likely to displace older forms. This phenomenon is known as functional displacement (Ferguson and Perse, 2000; Henke and Donohue, 1989). For example, Ferguson and Perse (2000) concluded that the World Wide Web may be functionally similar to television, but it may not replace television because it is not as relaxing as television viewing to its users. Expanding the uses and gratifications approach, Feaster (2009) found that even when two types of media have similar functions (referred to by Feaster as 'niche overlap'), they may be used complementarily.

Previous research on the displacement or complementary effects of the internet has offered useful theoretical concepts with a variety of interesting findings. However, several important theoretical and methodological issues have yet to be addressed. First, the most popular measure of the 'use' of the internet and other media was time spent on them. Such time measures cannot capture the aspect of what media users actually do when they use the media. It is almost impossible to consider what types of online activities are displacing or complementing older media use when the time spent on media is the exclusive measurement (Jung et al., 2001; Moy et al., 1999).

Second, earlier studies treated the internet as one medium, when in fact the internet comprises multiple media functions. When people use the internet, they have opportunities to engage in diverse activities: communicating with others, obtaining various types

of information, gaining access to diverse services and to other technologies such as mp3 files or movies (Dutton, 1999). People have different patterns of internet use. Such varying internet use patterns can have different effects on the use of other media. For example, John may use the internet mainly to conduct work-related research, while Mary may use the internet mainly for entertainment. Between these two cases, we can observe the differing effects of internet use on other forms of traditional media.

As one way to overcome the limitations of past studies, we propose to categorize adolescents' internet use into several types. Our attempt is guided by the concept of internet connectedness (Jung, 2008; Jung et al., 2001). Internet connectedness is a multidimensional concept of characterizing and measuring the ways in which individuals use the internet. Internet connectedness was developed to measure post-access digital divides in the ways in which people use the internet (Jung et al., 2001). It was applied in several previous studies to understand the breadth of internet activities in which people engage, the intensity of people's internet use, and the centrality of the internet in people's everyday lives (Jung, 2008; Jung et al., 2005; Kim et al., 2004, 2007).

Based on the concept of internet connectedness, we propose that the internet activities in which adolescents engage can be categorized in several ways. Once several types of the internet connectedness are identified, we will examine the relationship between each type of internet connectedness and traditional media use, including television, radio and newspapers.

RQ1: What are the types of internet activities in which adolescents participate?

RQ2: How are the uses of television, radio and newspapers related to each type of internet connectedness? Do adolescents' traditional media use exhibit different patterns depending on their types of internet connectedness?

Goals for media use

For a better understanding of the relationship between different media, we intend to investigate the influence of adolescents' goals when using the internet on the actual use of the internet and other media. We use the concept of goals as explained by media system dependency (MSD) theory (Ball-Rokeach, 1985). In MSD theory, different personal goals are likely to affect individuals' levels of dependency relations with a media system. The scope and intensity of the goals are likely to influence the strength of the dependency relationships with media. The goals that people have when choosing communication media can be classified into three types: understanding, orientation and play (Ball-Rokeach, 1985). Each goal type has social and personal dimensions. First, reading the social world around you is a social understanding goal, and reflecting yourself is a personal understanding goal. Learning how to interact with others is a social orientation goal, while determining what actions to take is a personal orientation goal. If you are motivated to consume media contents for entertainment with other people, you are exhibiting a social play goal, whereas if you intend to connect to media by yourself for play and entertainment, you are engaged in a solitary play goal (Ball-Rokeach and Jung, 2009). The same activity can entail two or more different goals (Ball-Rokeach, 1985). For example, participating in social networking sites can fulfill the goal of understanding but also the goal of play.

Past studies have applied the concept of goals to examine people's dependency relationships to a television program (Ball-Rokeach et al., 1984), television genres (Grant et al., 1991), newspapers (Loges and Ball-Rokeach, 1993) and radio (Ball-Rokeach et al., 1999). Compared to other media uses, the use of the internet is likely to involve a wider range of activities based on a broader range of personal goals. If the goal is to understand what is going on in society, a person can read an online newspaper. If the goal is to express oneself, she can join an interest group or a support group to interact with other people. If the goal is to have fun with others, one can engage in interactive online games. Due to the multimedia nature of the internet, people's goals for going online are likely to be an important factor in affecting what they actually do on the internet.

Depending on the types of everyday goals, how individuals manage their use of various new and old types of media is likely to vary. For certain goals, individuals will be satisfied with using only one medium. However, for other goals, they may connect to several types of different media (e.g. Jung et al., 2005; Lin et al., 2010). For example, to understand the result of an election that occurred one day earlier, a student may watch television news and use the internet to read online news. If this is the case, the relationship between new and old media should be examined for each type of goal. In this study, we hypothesize that individuals' internet connectedness is likely to differ according to the specific goals that they intend to accomplish by going online.

In addition, we examine the relationship between internet-related goals and people's use of other media. As mentioned above, the internet may not be the only medium to which they will connect to achieve a certain goal. Therefore, rather than exclusively examining the relationship between goal types of and internet use, we also examine the relationship between internet-related goals and people's use of other forms of media. We believe that internet-related goals are also likely to influence adolescents' use of other media, including television, radio and newspapers.

H1: The goals that adolescents have for going online affect the types of activities they engage in online.

H2: The goals that adolescents have for going online affect their use of other media, specifically television, radio and newspapers.

Methodology

Data collection

Survey data were collected from middle school students in five East Asian cities: Hong Kong, Seoul, Singapore, Taipei and Tokyo, in 2007. This study was our second wave of data collection in East Asian cities. The first set of data was collected in 2001 in Seoul, Taipei and Singapore (Jung et al., 2005).

Surveys were administered in classroom settings. A multistage cluster sampling method was used in each city based on different school districts and levels of school resources. In Seoul, we divided 26 municipality units of Seoul, *Gu*, into three groups – rich, medium and poor – in light of area-based inequality in economic resources as measured using each *Gu*'s level of financial independence from the city. In each cluster,

we selected two middle schools, and from each of the six schools, two second-grade classes (equivalent to 8th graders in the US) were randomly selected. In the other four East Asian cities, where economic resources vary more prominently between public and private schools than between geographical areas, we classified schools as public or private and proceeded to choose the same number of classes from each category. We obtained a sample of 1874 students, of which 436 were sampled from Seoul, 401 from Singapore, 398 from Taipei, 318 from Hong Kong and 321 from Tokyo. Fifty-four percent were female and the average age was 14.

The questionnaire was first developed in English and then translated into Korean, Chinese (Mandarin for Taipei and Cantonese for Hong Kong), and Japanese. For the Singaporean students, we used English as it was their first language. Pilot studies were conducted in each city and revisions were made accordingly.

Measures

Types of internet connectedness. We asked the respondents how often they participated in each of 13 different online activities: email, instant messaging, blogging, playing games, BBS (Bulletin Board System) seeking information, listening/downloading music, reading the news, signing petitions, voting, conducting school-related research, shopping and watching TV/movies. For each activity, the respondents marked their answers on a four-point scale where 1 represented 'never,' 2 'rarely,' 3 'sometimes,' and 4 'frequently.'

Television, radio and newspaper use. Respondents were asked, 'How often are you involved in the following activities?' and they marked their answers on a four-point scale where 1 was 'never,' 2 was 'rarely,' 3 was 'sometimes,' and 4 was 'frequently.' The activities that were used for this study include watching TV (M=3.36, SD=.78), listening to the radio (M=2.26, SD=1.00), and reading broadsheet (paper-based) newspapers (M=2.52, SD=.94).

Internet-related goals. As antecedent variables predicting the types of internet connectedness, we asked respondents how helpful the internet was for achieving each of the six goals based on media system dependency theory (see the *Goals for media uses* section) (Ball-Rokeach, 1985): to understand what's going on in society (M=2.79, SD=.91), to express my opinion (M=2.53, SD=1.00), to accomplish school-related tasks (M=3.24, SD=.88), to ask people for advice (M=2.58, SD=1.04), to kill time (M=3.35, SD=.88), and to have fun with others (M=3.08, SD=1.04). For each goal, respondents marked their answers on a four-point scale where 1 represents 'never,' 2 'rarely,' 3 'sometimes' and 4 'frequently.'

Result

Types of internet connectedness

To derive the types of internet activities with regard to research question 1, a principal component analysis was conducted. As a result of varimax rotation, three factors were

Table 1. Principal component analysis for the types of internet connectedness

	Component		
	Communication/ entertainment	Expression/ participation	Information/ research
Instant message/chatting	**.777**	.195	–.032
Play games	**.632**	–.114	.017
Email	**.684**	.006	.304
Listen/download music	**.630**	.325	.049
Watch TV/movies	**.544**	.291	.072
BBS	.142	**.686**	.069
Maintain personal website/blogs	.434	**.518**	–.039
Sign petition	–.016	**.643**	.221
Online shopping	.107	**.641**	–.088
Online vote	.170	**.550**	.419
Seek information	.033	.045	**.762**
Read news	.046	.404	**.622**
Conduct school-related research	.087	–.043	**.630**

Note: Rotated method: Varimax with Kaiser Normalization.

derived (Table 1). The first factor included instant messaging, playing games, using email, listening/downloading music and watching TV. This category is termed *communication and entertainment* (M=2.78, SD=.74) (Cronbach alpha = .72). The second factor included BBS, blogging, signing petitions, online shopping, and voting and is termed *expression and participation* (M=1.73, SD=.60) (Cronbach alpha = .68). Variables that were included in the third factor are seeking information, reading news, and conducting school-related research, which we call *information and research* (M=2.37, SD=.69) (Cronbach alpha = .53). These three factors indicate different types of internet connectedness. They were used as dependent variables for the analyses in the study.

Correlations between the three types of internet connectedness were positive and significant, but the sizes of the correlation coefficients were less than 0.5, indicating the discriminant validity of the factors. The correlation between *communication/entertainment* and *expression/participation* was r=.450 (p<.05); that between *communication/entertainment* and *information/research* was r=.213 (p<.05); and that between *expression/participation* and *information/research* was r=.333 (p<.05).

Relationships between the types of internet connectedness and other media

To respond to the second research question, we assessed how the three types of internet connectedness (communication and entertainment, expression and participation, and information and research) were correlated with television use, radio use and newspaper use (Table 2). Household income, parents' education levels, gender and cities were controlled in the partial correlation analyses. *Communication/entertainment* had positive

Table 2. Partial correlations of the types of internet connectedness and other media

	TV	Radio	Newspapers
Com/entertain intensity	.177**	.162**	.043
Express/participate intensity	.018	.144**	.106**
Info/research intensity	.015	.094**	.299**

Note: **p<.01. Controlled for household income, father's and mother's educational levels gender, and cities.

correlations with television use and radio use (TV: r=.177, p<.01; radio: r=.162, p<.01). *Expression/participation* had a positive relationship with radio (r=.144, p<.01) and newspapers (r=.106, p<.01). Finally, *information/research* had positive correlations with the newspaper (r=.299, p<.01) and radio (r=.094, p<.01). Different types of internet connectedness exhibited different relationships with traditional media (RQ2).

Goals and different media

To test the influence of internet-related goals on the types of internet connectedness (H1) and on the use of television, radio and newspapers (H2), multiple regression analyses were conducted (Tables 3 and 4). Gender, household income, parents' educational levels and cities were controlled. First, five of the six goals significantly influenced adolescents' engagement in *communication and entertainment* activities. Goals to have fun with others (b=.194, p<.01), to express my opinion (b=.169, p<.01), to kill time (b=.140, p<.01) and to ask people for advice (b=.055, p<.05) had positive effects, and the goal to accomplish school-related tasks had a negative effect on connecting to the internet for *communication and entertainment* activities (b=–.054, p<.01).

Regarding the *expression/participation* related activities, those who have goals to express my opinion (b=.288, p<.01), to ask people for advice (b=.142, p<.01) and to kill time (b=.075, p<.01) were more likely to engage in those activities. A goal to accomplish

Table 3. Effects of goals for going online ('The internet is helpful to…') on the types of internet connectedness (Standardized Coefficients of the Regression Model)

	Com/entertain	Express/participate	Info/research
Express my opinion	.169**	.288**	.048*
Understand what is going on in society	–.003	.009	.284**
Accomplish school-related tasks	–.054**	–.049*	.228**
Ask people for advice	.055*	.142**	.082**
Kill time	.140**	.075**	.007
Have fun with others	.194**	–.010	–.120**
Model	F=112.85**	F=41.78**	F=39.90**

Note: * p<.05, ** p<.01.
Controlled for gender, household income, parents' educational levels and cities.

Table 4. Effects of goals for going online ('The internet is helpful to…') on connections to television, radio and newspapers

	TV	Radio	Newspaper
Express my opinion	.014	.047*	–.001
Understand what is going on in society	–.043	.065*	.210**
Accomplish school-related tasks	.033	.001	.033
Ask people for advice	–.058*	.014	.013
Kill time	.044*	–.009	–.072*
Have fun with others	.099**	.030	–.034
Model	F=23.41**	F=23.75**	F=22.66**

Note: * p<.05, ** p<.01.
Controlled for gender, household income, parents' educational levels and cities.

school-related tasks had a negative effect (b=–.049, p<.05). For *information/research* related activities, the goals to understand what's going on in society (b=.284, p<.01), to accomplish school-related tasks (b=.228, p<.01), to ask people for advice (b=.082, p<.01), and to express my opinion (b=.048, p<.05) were found to have significant and positive effects, while having fun with others had a negative effect (b=–.120, p<.01) (Table 3). These different relationships between goals and types of internet activities support hypothesis 1.

Regarding the influence of internet-related goals on television use, having fun with others (b=.099, p<.01) and killing time (b=.044, p<.05) had significant positive effects on television use. That is, those who have internet-related goals to have fun with others and to kill time are also likely to choose television to fulfill the same goals. On the other hand, the goal of asking people for advice (b=-.058, p<.05) had a negative effect on television use. For the radio use, the goals of understanding what is going on in society (b=.065, p<.05) and expressing my opinion (b=.047, p<.05) had significant positive effects. For newspaper uses, the internet-related goal of understanding what's going on in society (b=.210, p<.01) had a significant positive effect, whereas the goal of killing time had a negative effect (b=–.072, p<.05) (Table 4). The results indicate that goals for using the internet also influence adolescents' use of other media. Hypothesis 2 is also supported.

Discussion

We examined the internet connectedness of adolescents in relation to their use of traditional media, including television, radio and newspapers. We first identified three types of internet connectedness: communication/entertainment, expression/participation and information/research, after which we examined how each type of internet connectedness was related to adolescents' use of other media. Finally, how adolescents use the internet and other media to fulfill six types of internet-related goals was examined. The results of partial correlations and multiple regressions demonstrated the ways in which adolescents used new and old media to fulfill each media dependency goal.

Types of connectedness matter

In this article, we examined adolescents' internet use patterns by categorizing their internet connectedness into three types: communication/entertainment, expression/participation and information/research. Rather than considering internet use as one type, we categorized adolescents' internet connectedness into three types for a better understanding of the ways in which they connect to the internet in the context of other media. In past studies, internet connectedness was measured as an aggregate index (Jung, 2008; Jung et al., 2001); therefore, researchers have not paid much attention to specific activities that people engage in online. Three types of internet connectedness were derived by a principal component analysis from 13 internet activities that required different skills and orientations (see the *Methodology* section). The list of activities, therefore, represents diverse activities that can be done on the internet, covering a broad array of activities that are available on the internet.

Our East Asian adolescent respondents engage in *communication and entertainment* activities the most (M=2.78), followed by *information and research* (M=2.37) and *expression and participation* related activities (M=1.73). That is, adolescents in East Asia use the internet most often to communicate with others and engage in entertainment activities. They also use the internet to get information and conduct research, but the internet was less commonly used for expressing themselves and participating in public and civic activities. This result is consistent with other studies conducted outside East Asian contexts. Those studies found communication and entertainment as the main use of the internet among adolescents (e.g. Jones and Fox, 2009). The result showing that communication and entertainment can be put together as one factor deserves attention. It is likely that communicating with their friends via instant messaging, email and social media serves the purpose of transmitting information, but it also serves to confirm their relationships and have fun with others, which overlaps with entertainment. The mingling of communication and entertainment suggests a trend of communication on the internet among adolescents (Schuurman et al., 2011).

Overall picture of media connectedness

In this study, we emphasized that the internet should be examined in relation to other existing media. To accomplish this objective empirically, we first examined the correlations between adolescents' connectedness to three types of internet activities and their use of traditional media. As a result, we were able to obtain a picture of the relationships between the different media, as shown in Figure 1. Television had a positive correlation with the *communication and entertainment* connectedness, indicating that those who engaged in entertainment and communication related activities online were also likely to have stronger connections to television. Information on what type of television programs adolescents watch was not included in our data. However, several past studies on adolescents' television viewing suggest that entertainment programs are the most popular television genre for adolescents (Carpentier et al., 2009; Strasburger et al., 2009). Based on these previous studies, we can infer that the internet and television can co-exist as main channels for entertainment and communication activities among adolescents. A further

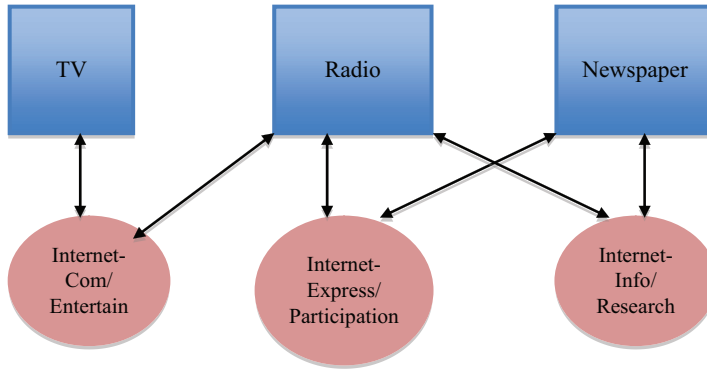

Figure 1. Relationships between the three types of internet connectedness to TV, radio and newspapers

study examining adolescents' use of the internet and choice of television genres will provide a better understanding about how adolescents' internet use and television use are related to each other.

Radio had a positive relationship with all three types of connectedness, which indicates that adolescents may listen to the radio while engaging in diverse types of internet activities. Positive relationships between radio and other types of media were found in several past studies as well (Lee and Kuo, 2002; McClung et al., 2007; Newell, 2007; Newell et al., 2008). For example, Lee and Kuo (2002) found that the increased use of the internet was associated with an increase in the time spent listening to the radio. Few studies to date, however, have included an in-depth investigation on why the radio has a positive relationship with internet use. An analysis of the actual content of the radio programs and an in-depth study of adolescents' radio listening patterns can provide an explanation of the positive relationship between radio listening and different types of internet connectedness.

The newspaper media type was correlated with *information/research* and *expression/participation* connectedness, showing a higher-level correlation with the former type. This result suggests that those who search for information and conduct research online are more likely to read paper-based newspapers than those who do not engage in such activities. This finding is consistent with those of several previous studies showing that those who read newspapers are more likely to search for information online and engage in civic activities, such as visiting political websites or posting opinions on government websites (Althaus and Tewksbury, 2000; Shah et al., 2001; Stempel et al., 2000). In an additional analysis to examine the newspaper readership among our respondents, we found that 49% of the respondents read paper-based newspapers. By city, the majority of adolescents in Hong Kong (62.9%), Taipei (55.7%), Singapore (57.1%) and Tokyo (50.5%) read newspapers, while only 23.9% of adolescents in Seoul do. Seoul (23.9%). The descriptive analysis indicates that East Asian adolescents in our study still maintain fairly high newspaper readership except for Seoul. In comparison, 32% of American adults responded that they read paper-based newspapers (Rainie and Horrigan, 2007).

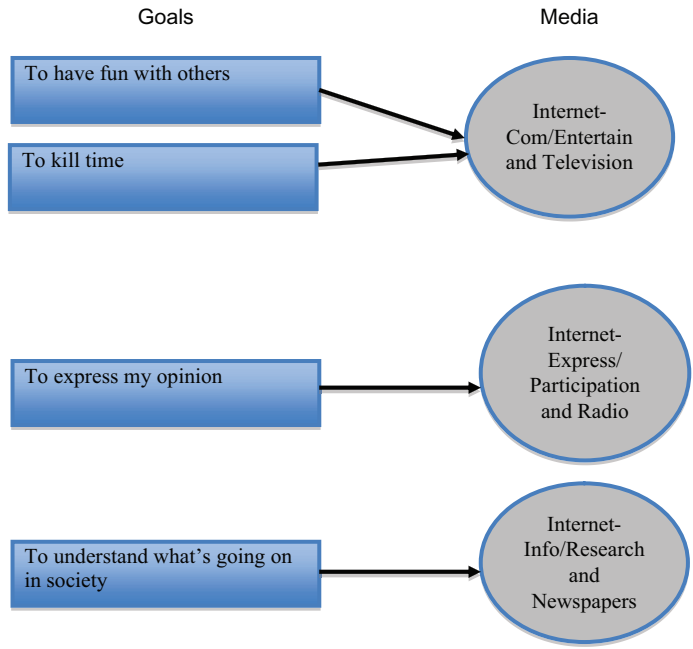

Figure 2. Media pairs according to internet-related goals.

Goals and the media

As another way to understand the relationship between the types of internet connectedness and other media, we assessed the influence of adolescents' goals when using the internet. First, we examined how each of the six internet-related goals influenced adolescents' connectedness to the three types of online activities. Second, we examined how the same six goals influenced adolescents' use of television, radio and newspapers. Our examination revealed that adolescents used more than one medium to fulfill a specific goal. Figure 2 shows the media pairs used by East Asian adolescents for different goals. For example, to fulfill the goal of having fun and killing time, East Asian adolescents not only connected to the internet for communication and entertainment activities, but also watched television. This result is consistent with the result of our second research question, which showed a positive correlation between communication/entertainment connectedness and television viewing. The correlation between the two may be explained by the common goal underlying the use of the two types of media. In other words, adolescents in our study tend to watch television in order to have fun and to kill time, which are the same goals they reported when using the internet for communication and entertainment.

Expression and participation associated with internet connectedness and listening to the radio are both associated with fulfilling the goal of expressing one's opinion. That is, to express their opinion, adolescents listen to the radio and engage in online activities such as signing petitions, voting or blogging. This result is consistent with previous studies, including that by Glevarec and Choquet (2003), which found that adolescents considered

the radio as a place for expressing themselves by calling-in, and sending emails, text messages or postcards to the radio program. Recently, many radio programs targeting a younger audience have launched websites where listeners can post comments and messages while radio programs are being broadcast or after the broadcast. The incorporation of the internet (e.g. websites, texting and social networking sites) into radio programs is likely to offer people more opportunities to express their opinions on the radio.

With regard to the goal of understanding what is going on in society, adolescents read newspapers and engage in information and research-related activities on the internet. That is, those adolescents who seek information, read news and conduct research online to understand what is going on in their society are also more likely to read traditional newspapers than their counterparts. As mentioned earlier, our study indicates that about half of the adolescents in our sample read paper-based newspapers. It will be interesting to revisit this topic in a few years to examine how online and offline news consumption patterns have evolved.

Limitations and future studies

Several limitations of this study deserve mention. First, household income and parents' educational levels, included as control variables in our analyses, were based on students' self-reports. The students' answers to these questions could be biased due to either insufficient knowledge or evaluation factors. Second, the types of connectedness were only derived for the internet. In future research, different programs and genres on television, radio and newspapers should be investigated in order to gain a fuller picture of the relationship between internet connectedness and the use of other media. Third, we examined the influence of internet-related goals on both the internet and traditional media, but specific goals that adolescents have when using television, radio and newspapers were not included in the current study. In future studies, having data on the goals related to each medium will provide a better understanding of the relationships between the goals and the use of different types of media. Fourth, we demonstrated that the three types of internet connectedness and the use of other media are correlated and that they share common goals. Our study suggests complementary relationships between types of internet use and other media, but it should be noted that our cross-sectional data cannot be used to make a conclusive statement about any displacement/complementary relationships between different media. Finally, we have not included city comparisons in this article, as we reserve this topic for future research. Also not included in the current analysis is detailed information about the demographic variations in each city. Although several cities, particularly Singapore and Hong Kong, have some degree of ethnic diversity, we did not take this into consideration. The current article was devoted to discovering the relationships between the use of different forms of media and the ways in which internet-related goals influence the use of these different forms. Recognizing that differences between cities is an important topic, we will engage in a more in-depth examination of communication and culture in each city in the future. We plan to connect adolescents' internet and other media connectedness to the unique social and communication environments and national infrastructures of each city. The findings of the current and future studies will provide both overall and specific pictures of the ways in which adolescents in East Asia connect to both new and old forms of media.

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Joo-Young Jung (PhD, University of Southern California) is an Associate Professor in the Department of Media, Communication and Culture at International Christian University in Tokyo, Japan. Her research interests include the implication of the internet and mobile phones in the communication ecology.

Wan-Ying Lin (PhD, University of Southern California) is an Assistant Professor in the Department of Media and Communication at the City University of Hong Kong. Her primary research interests include youths and new media, political use and impact of the internet, media effects and globalization.

Yong-Chan Kim (PhD, University of Southern California) is an Associate Professor at the School of Communication at Yonsei University, Korea. His research area covers new media technologies, health and risk communication and ethnic communities.