Time and Space Perception on Media Platforms

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This research explores media users' cognition of 'time' and 'space' across different media platforms and conducts a comparison among media genres including mass media and Internet media based on users' interactivities. Especially, this research focuses on the Internet's space and time perception based on communication genres such as e-mail, blogs, portals, news media, e-commerce, and social media. The research adopts two theories (construal level theory of time and space). The time-related theory is "temporal distance theory"; the space-related theory is "media space." The research is designed to measure users' perception of interactivity, time-construal level, and media space cognition while using the media. There are two independent variables: interactivities (contents, users, and media levels) and user involvement (CMC-user vs. user, HCI-user vs. media); there are two dependent variables: cognition of spatial and temporal levels. This research seeks the relationship among those variables through the structural equation model. The 307 data points were collected and analyzed to test the research questions. The results show that the dimension of the media side's interactivity affected media's usage time and space perception. There are 2X2 factor variables to affect time and space: one is human-computer interaction (HCI) and computer-mediated communication (CMC); the other is traditional mass media (one-way communication) and Internet media (two-way communication). The results prove that the users' perception of media time and space is based on the levels of interactivity. The levels of interactivity depend on media usage: one-one, one-many, synchronous, asynchronous, interpersonal, and social network communication. Online media provides greater social space, while traditional media tends toward para-space perception. On the other hand, the users' time cognitions between online media are different, such as fixed time versus cyber time.

Keywords: Construal time, Space, HCI, CMC, Interactivity, Media space, (A) synchronous, Hypertext

1. Introduction

THE new digital media can change the spatial and temporal dimension of social life. The manner of communication keeps evolving from one side to another. The digital century is accelerating development in both speeds of media delivery and in the amount of media content delivered to users. The message could only be delivered as fast as the person, train, or ship in the pre-electronic period. However, the first generation of electronic media, which included telegraphy, telephone, and radio, diminished physical limitation. Television and telecommunication were the next media, but they were still constrained by geographical boundaries. The Internet and mobile media are getting rid of time and space limitations. The medium is message (McLuhan, 1964) that the masses are part of the mess-age (McLuhan & Parker, 1969). That means the traditionally accepted special concept turned in to mess phased. The private space turn into public space and public space tuned into private space. Now a day people can communicate private communication in public space. In addition, the medium massages the masses, is part 'mass-age." A new media can frame or stress one part ignorance the other part. The new media create a big part and another make small part.

In the pre-modern media period, the users were inherent in the media content. Therefore, time and space were still tied together, while in the modern period, the media, such as broadcasting, collapsed the boundaries of time and space. In the post-modern period, cyber media, such as the Internet and mobile communication, has reshaped spatial and temporal boundaries.

Historically, a side of mental space or cyber community development stage of the media such as book, audio (radio), TV (electronic community), and the Internet (cyber community). Print media created imaginative space, while TV created perceptual space. In addition, the Internet created a cyber-space. This is called mental space. The human being creates various media, from interpersonal to mass media. These are closely related to time and space. The relative constancy theory is related to "time." God provides all people equally 24 hours per day, with no exception.

Strate (1999) defined the four different types of space (community) in media development history. The cognition space provides a new way for people to associate from different geographical location. There are four periods: 1) the text period from the 17th century to the end of 19th century; 2) the electronic communication and the entertainment period from the early 20th century to the 1950s; 3) the information technology period from the 1960s to early the 1980s; and 4) the virtual and the cyberspace period since 1984.

Table 1. Space and Presence between Analog and Digital Media

		Analog	Digital
Media Space	Type of Time Space	. Space biased . Synchronous . One point to multipoint . One way	. Spatiotemporal biased . Asynchronous . Multipoint to multipoint . Interactivity
	Relationship in Space	. Sender Orientation . World Society	. Communicator orientation . Network
Mode of Presence	Presence Method	. Atom . Electronics . Linear . Sound, image	. Bit . Wire. wireless, hybrid . Non-linear . Convergence
Society		. Modern . Construct . State oriented . Simulation	. Postmodern . De-consctructure . Post-state . Cybernetics

Joshua Meyrowitz's (1985) book, *No Sense of Place*, is interconnected with McLuhan's work. The new media changed the tradition concept of space and time. Strate (1999) explained the virtual space as the experienced space computer-related network. There are three levels of space: zero order, first order, and second order.

Table 2. The Orders of Cyberspace

Second order Cyberspace: Synthesis	Cyber Media Space Aesthetic Space	Information or Data Space	Interactive or Relational Space
First order Cyberspace: Building Blocks	Physical Space	Conceptual Space	Perceptual Space
Zero order Cyberspace: Ontology	Para-space or Nonspace		Space-time

(Source: Strate,1990)

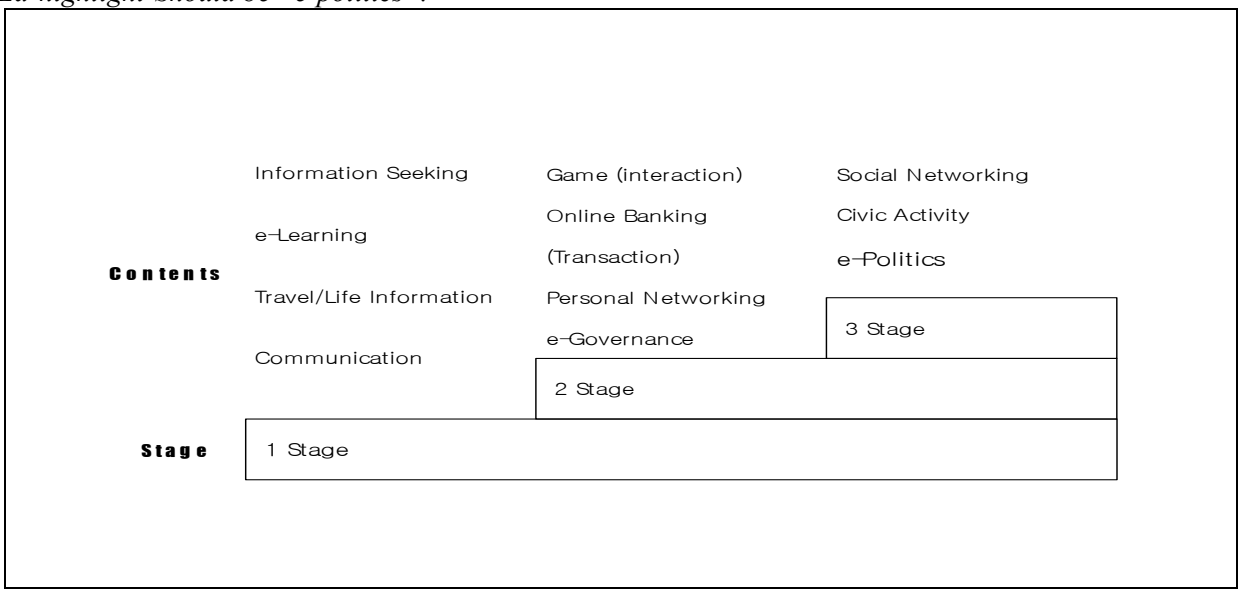
The virtual space construct is based on various aspects, such as data, visual images, and multimedia interactivities. The zero order space is the basic level of cyberspace. It is the beginning stage of new space through the Internet. The user conceptually realizes a new space will be created. It is an early stage of cyberspace time. The Internet user starts to realize the new type of space. At this stage, people use the online spaces as a communication media, such as e-mail, chatting, and news reading.

The first order space, which is the next stage, is the cyberspace perception period. People can exchange their ideas, news, and information. In addition, people can buy and sell commodities. It is a new stage of people perceptive cyberspace.

The second order involves the Internet facilitating social networks such as blog, communities, and social activities. Real social places and online cyber space converged as one. Cyber space is regarded as the public sphere (Harbermas) for social and political communications to function in a community and agora fashion, which more closely relates to the ideal conditions of deliberate e-politics.

Table 3. Contents and Space Stage

Ed-highlight-Should be "e-politics".



Cyberspace is an esthetic space created by computer networks with human interactivities. There are several types of cyberspace: one is information space (content), the second is online created cyberspace (e-mail, blog), and the third is social network space (e-commerce, e-politics, and social media).

People constantly interact with the outside world within time. Especially, human interactions involve three aspects: one is people, called interpersonal communication, the second is media content, called media communication, and the third is a combination of the previous two factors. Through interactions, people realize real space, and there are different communication topics based on the space.

Moreover, people spend time, as well as require specific time, such as synchronous time and asynchronous time.

The Internet brought new forms of human association, not only between humans but also in the way they get information. Giddens pointed out that digital new media may provide the means or methods for creating new forms of action and interaction in the cultural, political, and economical world. There are so many ways to communicate with other people and to acquire news and information. Therefore, it is crucially important to know how human association works via various media genres. From traditional mass media to digital media, privatized interactivities involve freedom of choice and the opportunity to transform one's life and self-image.

Life on the screen (Turkle, 1995) based on computer and digital media changed people's lives, and the new media shifted the cultural trend from modernity to post-modernity. The new media shapes

our cognition of time and space: reality time, cyber time, real world, and cyberspace. In the digital era, new media accelerates the speed of interaction and diversifies interactions. Communication technology overcomes the limitation of both physical and geographical barriers.

Post-media developments have brought about changing demands in terms of spending time and communicating in public spaces. While the impact of this has been given some attention in terms of media interactivities in time and space, the perception of space and the cognition of time have change at multiple levels. In order to proceed with an examination of the cognition of time and space, it is necessary first to be able to measure each media's difference, including mass media, Internet media, and human-computer interaction (HCI) and computer-mediated communication (CMC) aspects.

When people use a medium, they manage time and place; they realize the actual time spending and cognition realization, and they also create "symbols" of private, public, air, and cyber space.. These symbols are created by using metaphors, borrowing terms, creating themes, using visual icons, and emphasizing certain keywords.

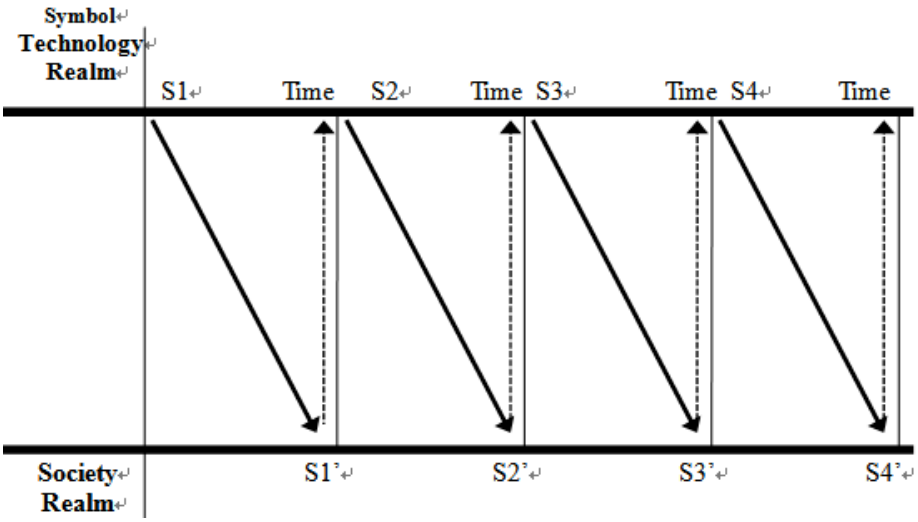


Figure 1. Genre Model based on the Social Construction Model by Yates and Orlikowski

According to Yates and Orlikowski's (1992) "social construction" model of technological concept development, the "symbol" of the new technology has developed and changed in serial stages. The consistency between time and space shifted from pre-electronic time to electronic and digital time. First, time (when) and place (where) in the pre-modern era were bound together; second, time and place in the modern era began to separate; and finally, time and space are separated in the post-modern era. Anthony Giddens explained in *The Consequences of Modernity* that "when" is connected with "where" in the natural environment. Telephone, radio, and TV travel across vast distances at a great speed. And the new digital media changes people's cognition about time and space.

The term S1 begins in time 1 (development stage) as a construction of the technology realm. The creation of S1, the starting point, is for negotiation between the technological and society realms. Thus, S1 is either metaphor or a term borrowed from other technologies to establish the concept. The society adopts S1 in the first time phase, but the symbol S1fails in society as use and technology continue to change. Therefore, there is a newly constructed symbol S1´. The new concept is returned to the technology realm by society, where it is then fed back into the next time phase as a new symbol S2.

For example, in the early history of radio and television, the existing mass media framed the new technology in serial stages (S1, S2, and S3) from novelty to complete development. However, in the early development stage, a new technology is never only a new way to do an old thing. For example, the "iron horse" didn't properly define a train, nor was the "horseless carriage" completely appropriate for the automobile (Rothschild, 1994), neither the "wireless telegraph" for the radio, nor "the look-listener" for TV

(Kim & Robinson, 1994). Radio was called "wireless telegraph" in 1899, later "radiotelegraphy," and then "radiotelephony" during its development stage in the late 1910s. Finally it was just "radio" once the broadcasting media was fully established in the 1920s (Douglas, 1988). In the Internet case, news media and the public also summoned certain consensus terms to describe the unfamiliar Internet during similar development phases. However, the news media and public eventually conceptualized the Internet's nature, usages, meaning, and vocabulary during its evolving media development phase.

As long as media is developing, the spatial and temporal dimensions of social life and user perceptions have changed, and the spatial and temporal boundaries also have changed. The new media has changed the face-to-face interaction and also the cognition of 'time' and 'space'. Digital media has a bearing on the spatiotemporal aspects of social life; the other type of media creates a new type of social space.

The new media affects the way in which users experienced the spatial and temporal characteristics of daily social life. People experience new aspects of time and space, such as the collapse of time and space, uncoupling of time and space, and transformation of time and space.

2. Time

TRADITIONAL media's time is limited to the boundaries of time and space. Live TV cuts across geographic and social boundaries. Electronic media provides non-linear, pop-up information, which makes sense of "everything happening everywhere." Benjamin said there was a loss of authentic time and space in contemporary media. An early book that dealt with media, time, and space is *The Bias of Communication* (1951) written by Harold Adam Innis. He argued that using different interactivities or text has different consequences for the control of time and space. This is the bias of communication. Communication is always related to religious, political, and economical power. Moreover, network society is closely related to personal, social, political, and cultural power. While time and space are intricately and integrally interconnected, they are separated by different media technologies.

Table 4. Types of Time Concepts

1.(physical time)	Measurable Time	(linear time) (mechanical time)
2. (natural time)	Time as Nature itself	(circular time) (biological time) (physiological time)
3. (psychological time)	Convergence Human Experience and Culture into Time	(historical time) (religious time) (social time) (cultural time)

Table 5. Dimensions of Individual Time

Dimension	Definition
Time Orientation	What time is the most important among Past, Present, and Future?
Time Span	The ability of carrying out a task under various time lines. (The ability to fulfill a task in various time periods.)
Scheduling	The degree of keeping deadlines or a time schedule.
Punctuality	The degree of keeping times perfectly, the degree of tolerating other people who can't be punctual.
Time Boundaries	The degree of setting obvious boundaries between work and leisure time.
Synchronization	The degree of controlling someone's time working with other

	people.
Coordination	The ability to organize in order to finish one task in sequence with other tasks.
Time buffers	The degree of having free time when arranging planned work or having spare time in case of unexpected accidents.
Pace	The speed that is accelerated depending on some task.
Time Urgency	The inner speed accelerated by an individual.
Speed vs. accuracy	The degree of compromising accuracy to accelerate speed.
Polychronicity	The degree of combining several activities synchronistically.
Awareness of time use	The perception of passing time.
Awareness of clock time	The awareness of real time.
Autonomy	The perception of controlling time.

Source: Francis-Smythe, J.A., Robertson, I.T. 1999. "Time-related individual differences", *Time & Society* Vol. 8 No.2, p.277

This research measures media 'interactivity,' 'time,' and 'space' through survey measurements of individual attitudes/approaches to time and space for each medium, and this study identifies each media's time and space dimensions. The rise of printing in the early modern era created a new form of publicness and a new concept of the public sphere. After printing, there developed several electronic, digital, and cyber media. Some form of mediated communication created certain phases of time and space. TV created a new form of publicness and spatial and temporal worlds. It also created a unique television space and a new type of para-social interaction. Digital media shifted the paradigm from face-to-face communication to social network communication.

Table 6. Regulation of Space Types

Type of Space	Examples	Level of Regulations
(Traditional Public Forum)	Road, Park, Square, Plaza (an open public space)	Freedom of expression, the difficulty of controlling all parts, the difficulty of gaining indispensable advantage, the difficulty of content regulation, the restriction of time, space, and method
(Limited Public Forum)	Museum, Library, School	The possibility of reasonable control depends on a transactor or an expression subject
(Non-Public Forum)	Office, Home, Airport, Court	The difficult of controlling space to express oneself personally
(Convergence Public-Private Forum)	Department Store	The confusion of application

3. Space Perception

THERE are several space-related theories in media and communication, including mental spaces theories (Fauconnier, 1994) and the conceptual integration theory or blending theory (Fauconnier & Turner, 2002). Mental space and media are related to general cognitive theories of human senses, making a diverse association of media interactivities.

Electronic and online media redefined time and space. Ferguson (1990) pointed out that digital and communication technology creates new spaces and communities. Mobile media allows for greater mobility, and live TV program enables 'colonization' of global TV space.

There are three media space types: sound, pictorial, and writing spaces. Basically, visual perception is the basic space factor, but sound (music, acoustic) is the next factor of space perception. The space

of a picture is formal and also involves moving images. The space of the picture should be a mirror of nature. Finally, words are transformed into a writing space. Cyberspace writing is more complex because it includes phonetic writing, graphs, diagrams, and icons. Using various text communications, online media constructs media space from private and public communities. Digital media, including mobile communication and the Internet, is always ready to incorporate new signs and create a new type of space.

3.1 Media Change Space and Landscape

The new digital media certainly reshaped the sense of place and space, and time and tempo; what is 'here' and 'there'; what is 'now' and 'past'; and what is 'public' and 'private.' People experience daily life in temporal and spatial contexts. Therefore, time and space are redefined and pluralized.

4. Research Questions & Method

4.1 Research Question

The research questions are constructed to measure perceptions of time and space (spatiotemporal) and to measure the extension and/or compression of the scope of time-space by various media genres.

- Research Question 1: Are the media characteristics (usage, interactivity, content), including real time usage and method of usage, positively affecting users' perception of media time and space?
- Research Question 2: Are the characteristics of content or message interactivity positively related to the users' perception of time and space?
- Research Question 3: How do users' perception of time and space differ based on personal media vs. mass media, traditional vs. new media, and communication vs. mediated media?

4.2 Research Method

4.2.1 Research Method and Subjects

This research is designed to figure out the 'interactivity' levels of mass media (one-way communication) and Internet media (two-way communication), and the research measures the perception of 'time' and 'space' using constructed questionnaires that are derived from previous studies. The literature review provided research variables (media variables, interaction variables, and time and space perception variables)

Using the survey method, the research measures the users' perception of time and space, as well as cognition of interactivity among mass media and Internet media. This survey's subjects are mostly college students because they are using both media daily as part of the digital era. Therefore, they could figure out the difference between HCI, McCone-way, two-way, traditional, and digital media. While they use the media, they could perceive and conceptualize time and space.

4.2.2 Operational Definition of Variables

To measure the dimensions of time and space, this research uses variables with measurable definitions. Interactivity is a two-way method of communication. The user perception of the interactivity is classified into HCI and CMC[1]. HCI is the media based on the news or information sources model (web,

[1] CMC (e-mail, messenger, mobile)→ time perception media; HCI (portal, news media, e-commerce, blog)→ space perception media

portal), whereas CMC is the media based on the communication model (e-mail, message, and communication). Time is measured in terms of spending time, immediacy, newness, and simultaneity. In addition, space is measured in terms of users' perception of media creation of space: media creation space (cyber-space) and user imagined space (hyper-space).

4.2.3 Questionnaires

The questionnaires are constructed along several dimensions: 1) media usage time and year, 2) media factors, 3) content factors, and 4) user perception factors. This study adopted previously used questionnaires to measure space and time recognition. The questionnaires are as follow:

Table 7. Spatial-temporal Measurement Scale of Media

Measurement Dimension	Variable	Scale
Usage Time	Using Period	Beginning Year and Month
Media Using Time	Using Time	Usage Time per Use
Media Genre	Most Used Genre	
Media Factor	Reason	
Interactivity Factor	Message	
Content Factor	Media	
Content Factor	People	
Time	Usage	CAS Media Model
Perception Factor Construction Image Factor	Cognition	CAM Media Model
Space	Using Place	Related Place
	Cognition Space	Construct Space

Table 8. Media Interactivities Questionnaires

Variables	Questionnaires
Message Interactivities	8 items
Media Interactivities	3 items
Time	5 items
Space	4 items
Other	

Table 9. User Perception of Time

Time Cognition	(1) This media is available whenever I can use it (ubiquitous)
	(2) This media is simultaneous usage (accompany)
	(3) The level of real time consuming (time consuming)
	(4) The cognitive time spending (temporal spending)
	(5) This media has simultaneous use and mobility of time

Table 10. Variables and Questionnaires

1) This media provides the interface where I am while I am using or navigating.
2) The user knows where he or she would go while I am using this media.
3) The user can navigate where he or she wants to go to sites.
4) Linked information is highly related to the appropriated information.
5) The portal sites provide visual window construction as map orientation.
6) The click immediately results in a pop-up screen.
7) The user easily navigates one page to another.
8) The portal site has optimal information and usability.
9) There are many selectivity information menus.
10) The portal has a communication menu section with many bulletins and menus.

4.2.4 Demographics of Respondents

Table 11. Respondents' Demographics

Classification		Frequency (N)	Percentage (%)
Sex	Male	157	51.1
	Female	145	47.2
	N/A	5	1.6
Age	19 Below	51	16.6
	20 - 24	194	63.2
	25 - 29	43	14.0
	30 Over	11	3.6
	N/A	8	2.6
Communication Expenditure	$50 below	207	67.4
	$60 - $100	41	13.4
	$110 - $150	43	14.0
	$160 - $200	7	2.3
	$210 over	9	2.9
	No response	50	16.3
Income	$1999 below	50	16.3
	$2000-2990	35	11.4
	$3000-3990	44	14.3
	$4000-4990	66	21.5
	$5000-5990	42	13.7
	$6000-6990	23	7.5
	$7000-7990	10	3.3
	$8000	25	8.1
	No Response	12	3.9

To measure the dimension of interactivity and cognition of time and space, the researcher collected data using constructed questionnaires employing the survey method. The total sample was 307 respondents. Table 11 shows the demographics of respondents. The genders were female (51.1%) and male (47.2%). A majority of respondents are between 20 and 24 years old (63.21%), more than 25 is 43(14%) and under 19 (16.6%), not apply (2.6%).

Concerning education, Respondents of 46.1% of the sample are university students or graduated from high school, and 30.6% of the respondents did not go to high school or just graduated from middle school. And 23.4% of the respondents graduated from a university. Regarding household income, 41% of

the sample earn less than 40,000,000 won ($40,000), 21.5% earn between 40,000,000 won ($ 40,000) and 50,000,000 won ($50,000) by monthly.

To measure the scale of both time and space, Table 12 was constructed.

Table 12 Measurement Scales of Time and Space

		News-paper/ Maga-zine	TV	CATV	IPTV	Mobile	Tele-phone	Portal	E-Com-merce	On-line News	Blog &Mini - Home page	E-mail	Mes-senger
Time Cognition	(1) This media is available whenever I can use it (ubiquitous)	4.60	4.42	4.23	4.22	6.05	3.97	5.08	4.58	4.61	4.83	4.78	4.93
	(2) This media enables simultaneous usage (accompany)	4.29	4.33	4.22	4.44	5.39	3.68	5.16	4.67	4.66	4.97	4.63	5.15
	(3) The level of real time consuming (time consuming)	4.25	4.66	4.52	4.37	4.49	3.53	4.72	4.57	4.00	4.75	3.70	4.87
	(4) The cognitive time spending (tem-poral spending)	3.21	3.98	4.24	3.86	3.56	3.42	3.68	4.25	3.48	4.17	3.44	4.20
	(5) This media has simultaneous use and mobility of time	4.78	3.50	3.30	3.23	5.85	2.62	3.66	3.40	3.53	3.58	3.48	3.74
Space Cognition	(1) This media contributes to commu-nity construction	4.16	4.45	4.03	4.06	4.67	3.61	5.22	3.97	4.51	5.25	4.12	5.00
	(2) This media is good for (public place) public sphere spending	4.29	4.40	3.74	3.75	4.01	3.77	4.76	3.70	4.59	4.25	3.96	4.27
	(3) This media is good for (private place) private place spending	4.52	4.76	4.62	4.73	5.45	4.38	5.21	4.77	4.30	5.38	5.00	5.25
	(4) This media is good for (space shar-ing) spatiality sharing	4.28	4.68	4.21	4.21	4.61	3.80	5.10	4.16	4.46	5.00	4.10	4.91
	(5) This media provides a (cyber-space) imaginative space	4.07	4.34	4.15	3.98	4.19	3.42	4.90	3.70	3.82	4.84	3.84	4.43

There are different characteristics among media types. The traditional media groups are higher in time cognition than the Internet media genres, whereas the Internet media groups are higher in space cognition. The convergence media, such as portals and blogs, is higher in ‘time’ and ‘space’ cognition.

4.2.5 Time Cognition in Media Platform

The Mean Difference of Usage Immediacy by Media Platform: The result shows that there are significant differences among media: 1) traditional media vs. cyber-media, 2) personal media vs. mass media, and communication media vs. mediated media. (1) This media is available whenever I can use it (ubiquitous). The statistical difference was tested by the *t*-tests, and the results are shown in Table 13.

Table 13: Mean Difference of Time Recognition by Platform (Question 1)
: (1) This media is available whenever I can use it (ubiquitous).

	Newspa-per/ Mag-azine	TV	CATV	IPTV	Mobile	Telephone	Portal	E-Com-merce	On-line News	Blog & Mini-Homep-age	E-mail
TV	1.785										
CATV	3.115*	1.924									
IPTV	3.068*	2.180*	0.229								
Mobile	-17.146**	-16.729**	-15.811**	-14.969**							

Telephone	5.805**	5.079**	2.259*	2.708*	18.164**						
Portal	-5.188**	-7.701**	-7.723**	-8.649**	11.628**	-11.071**					
E-Com-merce	0.190	-1.582	-2.951*	-3.604**	16.188**	-6.604**	7.280**				
On-line News	0.253	-1.941	-3.209*	-3.592**	16.943**	-6.587**	8.339**	-0.059			
Blog & Mini-Homep-age	-2.653*	-4.504**	-5.337**	-6.375**	14.575**	-9.018**	3.744**	-3.640**	-4.304**		
E-mail	-1.915	-3.887**	-4.912**	-5.655**	15.460**	-7.824**	4.187**	-2.572*	-2.987*	0.563	
Messenger	-1.033	-2.471*	-3.966**	-4.047**	16.237**	-6.856**	4.215**	-1.309	-0.991	1.687	1.141

*p<.05, **p<.001

There is statistical significance in the question: (1) this media is available whenever I can use it (ubiquitous). Mobile communication is superior to other media. Especially, mobile communication is superior to the general phone in terms of whenever the user can access it, called ubiquitous. Although both media are telephones, mobile is a more ubiquitous factor. On the other hand, the portal site is the second level of the ubiquitous access factor.

The other 'time' related question is: (2) This media is simultaneous usage (accompany). Table 14 shows *t*-test results by platform.

Table 14. Mean Difference of Time Recognition by Platform (Question 2)
: (2) This media is simultaneous usage (accompany)

	Newspa-per/ Mag-azine	TV	CATV	IPTV	Mobile	Telephone	Portal	E-Com-merce	On-line News	Blog & Mini-Homep-age	E-mail
TV	-0.505										
CATV	0.649	1.447									
IPTV	-1.289	-1.053	-1.496								
Mobile	-10.927**	-9.817**	-11.109**	-8.503**							
Telephone	5.302**	6.132**	5.589**	6.330**	16.232**						
Portal	-8.741**	-8.872**	-10.267**	-7.021**	2.509*	-14.073**					
E-Com-merce	-3.561**	-3.094*	-4.475**	-1.575	7.130**	-9.127**	6.375**				
On-line News	-3.634**	-3.488*	-4.508**	-2.110*	7.474**	-8.865**	6.802**	-0.207			
Blog & Mini-	-7.218**	-6.586**	-8.203**	-5.274**	5.064**	-12.366**	2.774*	-4.021**	-4.201**		

Homep-age											
E-mail	-3.573**	-2.887*	-4.068**	-1.707	8.348**	-8.927**	6.790**	0.579	0.331	4.525**	
Messenger	-3.869**	-3.411*	-4.607**	-1.739	7.361**	-8.651**	5.842**	-0.207	-0.086	3.379*	-0.515

*p<.05, **p<.001

There is statistical significance in the question: (2) This media is simultaneous usage (accompany). Mobile communication is superior to other media. Especially, mobile is superior to general phone in terms of whenever the user can access it, called accompany or simultaneous usage (t=16.232, df=1, p<.001). Although both media are telephones, mobile is the more ubiquitous factor. On the other hand, the portal site is the second level of the 'simultaneous or accompany factor'. This has great significance compared to the telephone (t=-14.073, df=1, p<.001).

The third factor of time-related measurement is: (3) The level of real time consuming (time consuming). Table 15 shows t-test results by platform based on real time consuming (time consuming).

Table 15. Mean Difference of Time Recognition by Platform (Question 3)
: (3) The level of real time consuming (time consuming)

	Newspa-per/ Mag-azine	TV	CATV	IPTV	Mobile	Telephone	Portal	E-Com-merce	On-line News	Blog & Mini-Homep-age	E-mail
TV	-4.303**										
CATV	-2.427*	1.950									
IPTV	-0.846	3.553**	1.687								
Mobile	-2.177*	1.713	0.094*	-0.900							
Telephone	6.907**	11.228**	9.373**	8.389**	8.125**						
Portal	-4.967**	-0.754	-2.589*	-2.759*	-2.367*	-11.280**					
E-Com-merce	-2.872*	1.102	-0.514	-2.110*	-0.699	-10.601**	1.467				
On-line News	2.509*	5.953**	4.536**	2.742*	4.171**	-4.410**	6.926**	5.019**			
Blog & Mini-Homep-age	-5.033**	-0.682	-2.342*	-4.020**	-2.349*	-13.693**	-0.444	-2.388*	-7.511**		
E-mail	5.573**	9.732**	8.212**	6.334**	6.871**	-1.550	9.755**	8.299**	3.486*	10.383**	
Messenger	-3.124*	0.612	-0.965	-2.441*	-1.072	-9.665**	1.270	-0.546	-6.023**	1.420	-9.302**

*p<.05, **p<.001

There is statistical significance in the question: (3) The level of real time consuming (time consuming). The telephone is the time consuming media compared to other media. (It is less time spending.) While the blog and mini-home page is the most time spending media compared to the telephone (t=-13.693, df=1, p<.001). In addition the blog is the more time consuming compared to e-mail (t=10.383, df=1, p<.001). However, the blog is less time consuming to TV, portal, and messenger. E-mail is the less time consuming media cognition.

For the fourth factor, the 'time' related measurement is: (4) The cognitive time spending (temporal spending). Table 16 shows t-test results by platform based the cognitive time spending (temporal spending).

Table 16. Mean Difference of Time Recognition by Platform (Question 4)
: (4) The cognitive time spending (temporal spending)

	Newspaper/ Magazine	TV	CATV	IPTV	Mobile	Telephone	Portal	E-Commerce	On-line News	Blog & Mini-Homepage	E-mail
TV	-7.962**										
CATV	-10.155**	-2.744*									
IPTV	-5.613**	2.212*	5.201**								
Mobile	-3.732**	4.753**	6.818**	2.779*							
Telephone	-1.947	5.803**	7.527**	4.393**	1.102						
Portal	-4.940**	3.318*	5.315**	1.561	-1.726	-2.645*					
E-Commerce	-9.849**	-2.559*	0.455	-3.278*	-6.956**	-7.653**	-5.982**				
On-line News	-2.874*	5.255**	7.803**	3.960**	0.903	-0.849	1.790	7.712**			
Blog & Mini-Homepage	-9.294**	-1.528	1.397	-2.845*	-6.087**	-7.733**	-5.073**	0.940	-6.915**		
E-mail	-2.319*	5.997**	8.610**	4.373**	0.861	-0.036	2.383*	7.541**	0.676	7.382**	
Messenger	-13.326**	-5.362**	-3.559**	-6.873**	-9.643**	-10.226**	-7.597**	-3.256*	-10.814**	-4.317**	-11.882**

*p<.05, **p<.001

There is statistical significance in the question: 4) The cognitive time spending (temporal spending, which means time spending is too much). The CATV is the temporal spending questionnaire to other media consuming at statistical significance. CATV is more significant than the newspaper and magazine (t=-10.155, df=1, p<.001). (It is a more time consuming media), while the messenger is the most time spending media compared to other media. Especially, the messenger is more time consuming than newspaper or magazine (t=-13.326, df=1, p<.001).

For the fifth factor, the 'time'-related measurement is: (5) This media has simultaneous use and mobility of time (synchronous usage). Table 17 shows *t*-test results by platform based on cognitive time spending This media has simultaneous use and mobility of time (synchronous usage).

Table 17. Mean Difference of Time Recognition by Platform (Question 5)
: (5) This media has simultaneous use and mobility of time (synchronous usage)

	Newspaper/ Magazine	TV	CATV	IPTV	Mobile	Telephone	Portal	E-Commerce	On-line News	Blog & Mini-Homepage	E-mail
TV	10.295**										
CATV	11.768**	2.288*									
IPTV	11.237**	2.605*	0.409								
Mobile	-11.177**	-18.391**	-20.123**	-18.211**							
Telephone	17.014**	7.879**	5.724**	5.165**	23.628**						
Portal	9.909**	-1.304	-3.347*	-3.527*	18.510**	-9.034**					
E-Commerce	12.441**	1.526	-0.810	-1.266	20.438**	-6.848**	3.017*				
On-line News	10.355**	-0.334	-2.370*	-2.609*	18.727**	-8.428**	1.658	-2.642*			
Blog & Mini-Homepage	10.197**	-0.542	-2.641*	-3.439*	18.800**	-9.532**	0.653	-2.311*	-0.928		
E-mail	10.681**	0.063	-2.062*	-2.360*	19.586**	-7.641**	1.611	-1.290	0.472	0.951	
Messenger	1.556	-9.178**	-11.353**	-11.186**	12.451**	-16.792**	-9.046**	-12.467**	-9.762**	-9.918**	-10.447**

*p<.05, **p<.001

4.2.6 Space Perception by Platform

The spatial-related concept was measured using several dimensions including: 1) This media contributes to community construction; (2) This media is good for (public place) public sphere spending; (3) This media is good for (private place) private place spending; (4) This media is good for (space sharing) spatiality sharing, and (5) This media provides a (cyber-space) imaginative space.

The first dimension about space is: 1) This media contributes to community construction. The study measured the media's community construction and conducted *t*-tests between media. Table 18 shows the results.

Table 18. Mean Difference of Space Recognition by Platform (Question 1)
: (1) This media contributes to community construction

	Newspaper/ Magazine	TV	CATV	IPTV	Mobile	Telephone	Portal	E-Commerce	On-line News	Blog & Mini-Homepage	E-mail
TV	-3.902**										
CATV	1.807	5.091**									
IPTV	1.487	3.829**	0.000								
Mobile	-5.285**	-2.297*	-6.650**	-5.455**							
Telephone	5.187**	8.518**	4.149**	4.383**	10.824**						
Portal	-11.318**	-8.431**	-13.117**	-11.522**	-6.002**	-14.691**					
E-Commerce	2.189*	5.019**	0.833	1.051	8.506**	-3.137*	14.840**				
On-line News	-3.364*	-0.788	-5.134**	-4.747**	1.506	-8.370**	8.603**	-6.304**			
Blog & Mini-Homepage	-11.004**	-8.931**	-12.525**	-11.227**	-5.965**	-15.648**	-0.178	-13.024**	-8.137**		
E-mail	0.310	3.699**	-1.025	-0.247	5.778**	-5.142**	11.220**	-1.798	4.408**	12.448**	
Messenger	-2.761*	-1.737	-3.207*	-2.735*	-0.794	-4.560**	1.214	-3.376*	-1.317	1.249	-2.896*

*p<.05, **p<.001

Telephone is the low contribution to community construction, while blog is the most attribution factor to community construction (t=-15.648, df=1, p<.001) compared with the telephone. The portal is superior for community construction compared to other media. The portal has more media power for community construction than e-commerce (t=14.840, df=1, p<.001, the portal has more power).

The second dimension of space is: (2) This media is good for (public place) public sphere spending. The study measured the media's contribution to (public place) public sphere spending, and this study conducted t-tests between media. Table 19 shows the results.

Table 19. Mean Difference of Space Recognition by Platform (Question 2)
: (2) This media is good for (public place) public sphere spending

	Newspaper/ Magazine	TV	CATV	IPTV	Mobile	Telephone	Portal	E-Commerce	On-line News	Blog & Mini-Homepage	E-mail
TV	-1.227										
CATV	5.120**	7.123**									

IPTV	5.155**	7.137**	-0.609								
Mobile	2.492*	3.799**	-2.538*	-1.781							
Telephone	4.721**	5.923**	-0.153	0.216	2.063*						
Portal	-4.667**	-4.010**	-10.287**	-9.378**	-7.364**	-9.078**					
E-Com-merce	5.916**	7.516**	0.610	1.111	3.277*	0.814	11.560**				
On-line News	-2.886*	-2.529*	-8.226**	-8.983**	-5.833**	-8.126**	1.959	-10.180**			
Blog & Mini-Homep-age	0.266	1.440	-5.156**	-4.965**	-2.355*	-4.218	6.055**	-5.639**	3.086*		
E-mail	2.899*	4.378**	-2.063*	-1.490	0.592	-1.515	8.135**	-2.939*	6.423**	2.582*	
Messenger	-8.423**	-7.499**	-12.963**	-12.258**	-9.672**	-11.935**	-3.708**	-13.229**	-5.269**	-7.672**	-10.954**

*p<.05, **p<.001

The third dimension of space is: (3) This media is good for (private place) private place spending. The study measured the media's contribution to (private place) private sphere spending, and this study conducted *t*-tests between media. Table 20 shows the results.

Table 20. Mean Difference of Space Recognition by Platform (Question 3)
: (3) This media is good for (private place) private place spending

	Newspa-per/ Mag-azine	TV	CATV	IPTV	Mobile	Telephone	Portal	E-Com-merce	On-line News	Blog & Mini-Homep-age	E-mail
TV	-3.088*										
CATV	-1.146	1.451									
IPTV	-2.062*	0.215	-0.048								
Mobile	-10.681**	-7.834**	-9.629**	-7.639**							
Telephone	1.185	4.414**	2.874*	3.426*	11.389**						
Portal	-7.827**	-5.774**	-7.086**	-5.396**	3.114*	-9.201**					
E-Com-merce	-2.793*	0.000	-1.340	-1.008	8.870**	-4.077**	5.905**				
On-line News	2.606	4.580**	3.757**	3.706**	12.624**	0.553	10.584**	4.751**			
Blog & Mini-	-9.465	-6.698**	-7.704**	-6.715**	1.345	-9.845**	-1.726	-6.773**	-10.657**		

Homep-age											
E-mail	-5.535**	-2.555*	-4.691**	-2.944*	5.414**	-6.947**	2.483*	-3.204*	-7.283**	4.039**	
Messenger	-1.305	-0.379	-0.701	-0.423	2.628*	-1.815	1.639	-0.368	-2.082*	2.313*	0.765

*p<.05, **p<.001

The fourth dimension of space is: (4) This media is good for (space sharing) spatiality sharing. The study measured the media's space sharing, and this study conducted *t*-tests among subjects' cognition of spatiality sharing. Table 21 shows the results.

Table 21. Mean Difference of Space Recognition by Platform (Question 4)
: (4) This media is good for (space sharing) spatiality sharing

	Newspa-per/ Mag-azine	TV	CATV	IPTV	Mobile	Telephone	Portal	E-Com-merce	On-line News	Blog & Mini-Homep-age	E-mail
TV	-5.415**										
CATV	0.610	6.317**									
IPTV	0.432	5.092**	0.000								
Mobile	-4.064**	0.750	-4.946**	-3.790**							
Telephone	4.832**	9.718**	4.344**	4.218**	9.122**						
Portal	-9.102**	-5.175**	-10.347**	-9.429**	-5.623**	-3.289**					
E-Com-merce	1.359	6.147**	0.783	0.771	5.302**	-3.573**	12.617**				
On-line News	-2.133*	2.923*	-2.810*	-2.813*	1.547	-7.369**	8.522**	-4.280**			
Blog & Mini-Homep-age	-7.586**	-3.741**	-9.294**	-7.757**	-3.950**	-12.466**	1.537	-9.005**	-6.099**		
E-mail	1.746	6.568**	1.138	0.886	5.370**	-3.267*	11.018**	0.547	3.780**	8.847**	
Messenger	0.575	4.733**	0.612	0.588	4.038**	-3.011*	9.172**	-0.395	2.722*	7.734**	-0.685

*p<.05, **p<.001

The fifth dimension of space is: (5) This media provides a (cyber-space) cognitive space. This means the user recognized imaginative spatiality. Table 22 shows the results.

Table 22. Mean Difference of Space Recognition by Platform (Question 5)
: (5) This media provides a (cyber-space) imaginative space

	Newspa-per/ Mag-azine	TV	CATV	IPTV	Mobile	Telephone	Portal	E-Com-merce	On-line News	Blog & Mini-Homepage	E-mail
TV	-2.826*										
CATV	-0.781	2.527*									
IPTV	0.651	3.849**	1.969								
Mobile	-1.382	1.633	-0.511	-1.531							
Telephone	5.381**	8.311**	6.690**	5.218**	7.717**						
Portal	-8.008**	-5.861**	-6.856**	-8.508**	-7.179**	-12.794**					
E-Com-merce	3.317*	6.739**	4.400**	3.224*	5.473**	-2.219*	11.659**				
On-line News	1.933	4.863**	2.742*	1.813	3.945**	-3.579**	10.220**	-2.064*			
Blog & Mini-Homepage	-7.062**	-4.752**	-6.706**	-7.726**	-6.610**	-12.886**	0.620	-10.508**	-9.373**		
E-mail	2.014*	4.826**	2.960*	1.039	3.852**	-4.330**	10.771**	-1.773	-0.156	9.972**	
Messenger	2.403*	5.109**	3.308*	2.183*	4.228**	-2.115*	9.630**	-0.598	1.136	9.274**	1.111

*p<.05, **p<.001

There are several possible ways to provide space perception through electronic media. The spectrum is from a low level such as telephone and newspaper to a high level such as portal and blog. Especially, the blog media has a high level of space capability compared to the telephone (t=-12.886, df=1, p<.001).

The portal media has both HCI and CMC aspects, while the telephone has just human media interaction. Therefore, the portal provides both perceptual and cognitive space.

Table 23. Media Classification by Factor

	On-line factor	Image factor	Communication factor	Common factor
Portal	0.892	0.334	0.413	0.851
E-commerce	0.869			0.807
On-line News	0.834	0.312		0.798
Blog & Mini-Homepage	0.823		0.481	0.756
Newspaper / Magazine		0.809		0.678
TV		0.734		0.457

CATV		0.689		0.435
IPTV	0.385	0.656		0.574
Mobile			0.80	0.642
Telephone			0.71	0.324
E-mail	0.342		0.67	0.543
Messenger	0.431		0.66	0.421
Eigen Value	17.72	11.98	5.89	
Explained variance(%)	55.15	14.12	9.24	
Accumulation variance(%)	55.15	69.27	78.51	

principal component analysis, varimax rotation, Eigen Value> 1.0

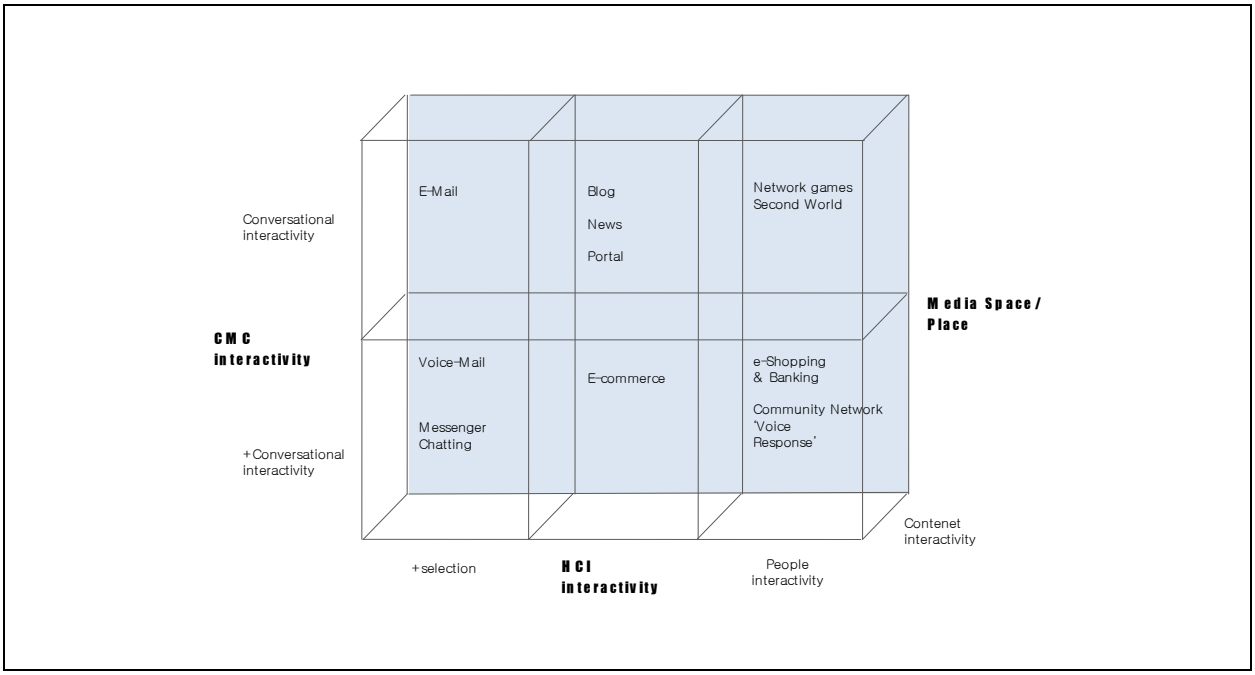


Figure 3.Media Space Types based on the Interactivities

5. Conclusions and Implications of the Study

5.1 Conclusions

Nowadays, the media evolution has been accelerated and combined with real daily life. A smart phone overcomes time constraints because the user can access it whenever needed, whereas social networking service creates various social media and space, which overcome limitations of space. The new media creates a new public sphere. People realize the media space as a social activities space. Moreover, the media affects awareness of public time as working time, and private time as leisure time. Therefore, the new media creates a "mass" message. To paraphrase McLuhan, "the medium is the (mass) age."

There are many different classifications between traditional mass media's social role and online social media, and these can have enormous influence on very different areas. In the field of politics in particular, these provide a new online "public sphere" and enable awareness of new political communica-

tion and new factors for participation in politics. Individuals and online media are factors affecting the recipients' predisposition, social political communication, and social behavior. By applying the O1-S-O2-R model, factors affecting awareness of time and space on the Internet and social communication's effect on the mass media and Internet were empirically analyzed and described. People's social actions and communication agenda are affected by the predisposition of actual people's orientation (O2), and these variables influence overall social behavior as well as response. For people who realize a medium as private space, their communication orientation is going to be personal topics and agenda. Moreover, their communication types are private and personalized.

This empirical research focused on perception of time and space in mass media and online media. The results may apply to content regulation and media policies.

5.2 Implications of the Study

Based on users' perceptions of on-line space and cyber time, including social, commercial, and political aspects, the users' predisposition determines the communication agenda and styles. Based on the perception of time and space, social communication's contents and types are affected. McLuhan (964) said "the medium is the message." One medium focused on the private message, the other media focused on the public message. Media is the changes not only space concept but also time perception called "mess" period.

Traditionally, the public sphere was a real public space. It shifted from real sphere to TV, from network TV to portal media.

McLuhan's anomalous position within communication theory can be credited to the fact that he was developing a spatial model of communication. Unlike traditional models, which focused on the transmission of a message, McLuhan's model was concerned with the transformation in the relationship between message and context. Based on the notion of acoustic space, McLuhan's notion of spatial communication was procedural, dynamic, and relational. He arrived at his theory through his reading of Harold Adams Innis, who had developed the notion that communication media exhibits biases toward space and time. McLuhan sought to address the spatial bias of contemporary communication systems by theorizing that electronic media was producing a dynamic space whose paradigm was the auditory (or acoustic) and which was counterposed to visual space. Any communication thus represented a relationship between what was communicated and the context in which it was communicated. Given that electronic media allowed for instant communication, communication took on an iconic quality, with communication taking place all at once, spatially, rather than in a linear fashion. By theorizing the context of communication, McLuhan was able to develop a theory of communication sensitive to the social and material employments of communications. The spatial bias of McLuhan's theory of communication has much in common with that of post-modernism, which provides a productive matrix for further research into McLuhan's theory of spatial communication.

5.3 Second Space

Second space is the cognitive space of ideas about space, including representations of human spatiality in mental or cognitive forms (Soja, 1996). The mediated space is the mediated spatial subject, artificial space, and social construction space. New online and smart mobile media is a new type of historic-spatial connection gaining greater prominence in user-based communication.

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