

Study of Building Sense of Place in Network World [†]

Shih-Jen Feng and Si-Ting Li * 

Department of Architecture, Chaoyang University of Technology, Taichung 41349, Taiwan;
fengshyhren@yahoo.com.tw

* Correspondence: sandy880327@gmail.com; Tel.: +886-972839714

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Abstract: If we look back at the sense of place and deconstruct this concept, it is a combination of “space” and “meaning”, and cyberspace may be developed as a “place” that is different from the real world, being unique and charming and more desirable. The purpose of this study is to discuss the unexpected existing space hidden in the Internet under the premise of interlacing life experiences and the Internet. We analyze the relationship between social media-mediated user emotions and cyberspace through a relevant literature review and a questionnaire survey, and summarize the possible factors that influence the relationship between cyberspace and users. The results of the analysis provide suggestions for future designers to consider when creating spaces in the online world and directions for subsequent researchers.

Keywords: sense of place; space; globalization; cyberspace; internet

1. Introduction

In today’s globalized society, the Internet is a form of a social media with great influence, showing all human beings a different kind of life than that previously imagined. In addition to the world in which we live, by connecting to the Internet through 3C electronic products, such as cell phones, computers, and tablets, we can easily bring our consciousness across time and space to another level of the Internet world, anytime and anywhere, forming a global village in which the whole world lives together. In this regard, Relph suggested that “globalization will transform many places into place-less environments” [1] as a negative effect, while Massey stated that “local specificity will be regenerated continuously” [2] as a positive point.

Given Tuan’s thought that “space can become place by giving meaning” [3] and Harrison and Dourish’s equation of place, i.e., “place = space + meaning” [4], whether the old theories can also be reflected in the era in which the Internet is inseparable from daily life is an important issue to investigate. We face problems in the age of the Internet, given its inseparability from everyday life. In addition to the emotional deprivation of original space and place, which leads to the proliferation of a sense of placelessness, what lies behind the phenomenon of disappearance may be the creation of a different space. If the specificity of place is not merely repeatedly regenerated in the same place, the possibility of transferring it to cyberspace can be assumed.

A summary report of the broadband usage survey commissioned by the National Communications Commission and conducted by the Taiwan Institute for Economic Research states that “By age, the total number of hours per week that people use social media to browse/read/comment/like/post broadly decreases with age, with 20.9 h being the most for those aged 16–25 and 9.52 h being the least for those aged 66 and younger.” [5].

In another report, “Digital Opportunity Survey of Mobile Phone Holders 108”, which was also commissioned by the National Communications Commission and conducted by United Marketing Research Corporation (Taipei, Taiwan), states that “The age structure of



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cell phone users is also stabilizing, with the phenomenon of a significant increase in the elderly population in 107 no longer seen, with 7.0% of cell phone users under the age of 20, 18.3% of cell phone users aged 20–29, and 19.9% of mobile phone users aged 30–39. The cell phone population aged under 20 accounted for 7.0%, 18.3% aged 20–29, 19.9% aged 30–39, 18.7% aged 40–49, 16.5% aged 50–59, and 19.6% aged over 60.” [6] It is clear that cell phone users are mainly in the 20–39-year-old age group, and the total number of hours spent on the Internet is highest in of 16–25-year-old the age group, while the second survey report points out that “the cell phone users’ mobile Internet access rate is 89.8%, and 31.2% rely solely on cell phones to access the Internet at home” [6]. This evidence shows that cell phones have become the mainstream Internet access tool. To avoid interference from external factors, the target population of this study is confined to college students, who are the largest group in this age group.

2. Literature Review

2.1. Sense of Place

In the book “Sense of Place: Experience, Memory and Imagination of Environmental Space”, it is mentioned that the sense of place is composed of five sensory methods: spatial sense, temporal sense, the five senses, awareness, and sensory memory (Table 1). The awareness and sensory memory that human beings have of space forms a certain experience, and that experience has the opportunity to transform space into place, as well as the experience itself into a sense of place [7]. Tuan suggested that experience is a collection of thoughts (mind) and senses [8]. Manzo found that it is the experience-in-place that gives meaning to place [9]. Jorgensen and Stedman argued that the term sense of place contains three components—place identity, place attachment, and place dependence—which correspond to the cognitive, affective, and behavioral domains, respectively [10].

Table 1. Method of forming a sense of place.

Feeling	Sensory Methods	
	Content	Effects
Sense of space	1. Subjective/objective 2. Real/abstract 3. Near/far	Providing stimulation
Sense of time	1. Venue 2. Viewpoint 3. State	Providing stimulation
Five senses	1. Sight 2. Hearing 3. Smell 4. Touch 5. Taste	Receiving stimuli
Awareness, Sensory memory	Memories are formed and feelings are accumulated	Giving meaning

There are many terms related to the sense of place, such as place attachment, place meaning, place dependence, place identity, place estrangement, and place lessness. The reasons for this phenomenon are related to the formation of the sense of place. Since everyone’s experience and intentions are different, there are differences in the way they describe their sense of place. Even so, the core of the sense of place cannot be separated from “human emotion about space” and “human-place relationship”, and the emotion that transforms space into place, no matter what kind of experience it comes from, can be called sense of place.

Shamai suggested three stages of sense of place, ranging from weak to strong: belonging to a place, attachment to a place, and commitment to a place. Each stage can be

further subdivided into two levels, and if a sense of placelessness is added, it becomes a continuous seven-level hierarchy (Table 2) [11].

Table 2. Sense of place level.

Level	Sense of Place Level
	Content
0	Not having any sense of place
1	Knowledge of being located in a place
2	Belonging to a place
3	Attachment to a place
4	Identifying with the place goals
5	Involvement in a place
6	Sacrifice for a place

2.2. Internet

In the late 1950s, during the Cold War, the U.S. Department of Defense established the Advanced Research Project Agency (ARPA) to deal with information technology, and after its formation, ARPA commissioned BBN to assist in the research and development of the system, creating the first network in the western United States in 1969. The network was only connected to computer equipment at four universities, and to prevent other computers from being connected to the network in the event of an emergency, the Network Control Protocol (NCP) was developed; the network was called ARPANET.

In the mid-1980s, it was decreed that all long-distance networks must be TCP/IP compatible, and the network was divided into two separate networks according to their functions. One was ARPANET, which was for research purposes, and the other was MILNET, which was for military purposes. The former network became private and commercialized as time went on, stimulating the creation of later network services, such as WWW, E-MAIL, FTP, and DNS services. At this time, the Internet was viewed as a purely static page, and users were able to access the information provided by the Internet but could not upload information to the web page. Although they could leave messages on the Internet, they could not edit messages or communicate with other users in real time.

Back in 2004, at the O'Reilly Media Web 2.0 conference, the concept of Web 2.0 was not yet established, and only the design and use of websites was regulated, without any restrictions on whom could set up a website. Proponents advocated that people would be able to collaborate and share through the Internet, believing that Web 2.0 was a new way of being online, that this interaction would be generated by universal participation and class equality, and that the concept of decentralization, where “everyone can provide information”, was particularly important. Many unprecedented technology products were created with the goal of enabling social networking with real-time online interaction, such as social media, web applications, social networking sites, blogs, and wikis. This era of the Internet, where the viewer is also the publisher, and where passive communication is transformed into active and two-way communication, is called Web 2.0. From 2005 to 2020, social media became the mainstream platform of the Internet era. Taking photos and uploading them to the Internet has become an ordinary daily life, and social media not only provides a platform for everyone to share their lives, but also gives people the best way to directly observe the development of the Internet.

Since the development of the Internet, there are divergent opinions on whether Web 3.0 has arrived. Web 1.0 and Web 2.0 are back-to-basics terms that do not exist as standards for the development of Internet technology, but rather as a term to describe technological changes. Elon Musk, the CEO of Tesla, publicly stated that he thinks Web 3.0 is a marketing gimmick, even saying, “Has anyone seen Web 3.0? I can’t find it.” Jack Dorsey, one of the

founders of Twitter, has also stated that “you don’t own Web 3.0, it’s owned by Venture Capitals and LPs. You can never escape their control, it’s just a labeled entity after all, figure out what you’re getting into and what you’re getting out of. Web 3.0 is just another Internet marketing gimmick, and the idea of decentralization is also a result of centralized management”. Even so, the reason and core purpose of Web 3.0 is to provide users with an unrestricted and freer online experience.

Several scholars mentioned that space cannot be examined independently from society, ignoring time processes. Nowadays, society is becoming more connected to the Internet; thus, the Internet is also crucial in exploring the sense of place. The development, concepts, and relationships of the Internet in its various stages are organized in the following table (Table 3).

Table 3. Comparison of Internet periods.

Item	Internet		
	Web 1.0	Web 2.0	Web 3.0
Period	1990–2005	2005–2020	2020–now
Ownership	Company	Company–individual	Individual
Symbols	Static web page	Social media, wikipedia, blogs	Cryptocurrency, non-fungible token
Concept	Messaging and data transfer	Real-time interactive communication	Decentralization
Relationship with people	Internet–people	People–internet–people	
Relationship with world	Dependence	Dependence–parallel	

2.3. Cyberspace

“Does space exist on the Internet”? This question is common to many scholars and involves more than just asking about the network or space. It includes the boundary between the real and the virtual and is also related to the questioner’s experience of cyberspace. It is important to be open minded when confronting this question and to understand that the definition of space will change over time, though it is still important to find common ground in each understanding. The following table lists the views of researchers on space in the Web in each period and analyzes the chronological distribution of Web 1.0, Web 2.0, and Web 3.0, as mentioned in the above section (Table 4).

The metaverse is one of the most talked-about topics in Web 3.0. In the book “Metaverse: Technology giants are competing for investment and unlimited business opportunities are emerging, are you ready?”, the author discusses this issue from the point of view of virtual worlds and proposes three world views: the space where human beings use computers is called the “real world”, which is the first type; the “ideal world”, which simulates the real world in the Internet world and provides Internet services, is the second type; the game space or “fantasy world”, which is completely detached from reality and full of imagination, is the third type; and the space that combines the above three types of worlds and reconstructs the real space is the metaverse (Figure 1). The definition of the metaverse is as follows. “An infinite world centered on multiple users entering from the real world made up of the real world that has been expanded to be more useful, the virtual world that has turned imagination into reality, and the multidimensional digital space that has been created by connecting to the Internet” [20].

Table 4. A review of literature on cyberspace.

Web Version	Viewpoint	
	Author	Relevant Research Contents
1.0	S-J Tung (1998) [12]	<ul style="list-style-type: none"> • Virtual space cannot replace the existence of real space. • Education can be used to increase the sense of community in the virtual space.
	C-I Wu (2001) [13]	<ul style="list-style-type: none"> • We believe that the existence of cyberspace can overthrow the original class system of real life. • The cyberspace has hollowed out the concrete thinking of the real world, and the understanding of the real world will be reduced. • In terms of life experience, the virtual community and the real community in the cyber world influence each other.
	S-H Weng (2009) [14]	<ul style="list-style-type: none"> • The Internet is both a space and a platform for various services, with the characteristics and drawbacks of “virtual”. • The behavioral model of the Internet is embodied in the physical space, providing convenience and interactivity, but also satisfying practical and spiritual needs.
2.0	C-L Tu; B-K Liang (2009) [15]	<ul style="list-style-type: none"> • Cyberspace has the socio-spatial characteristic of “no geographic entity”. • Social organizations in cyberspace have hierarchical relationships. • It can be linked to local spaces, breaking geographical limitations and allowing people from different regions to come together.
	C-S Sun (2010) [16]	<ul style="list-style-type: none"> • Space can be “deciphered” or “decoded”. In addition to material practices, space also suggests an ideational process, and the symbols are part of the spatial language, the actual relationship between the subject and its environment. • Space embodies the text of the story, referring to the directionality of the relationship with everyday life.
	Jeffrey Li (2010) [17]	<ul style="list-style-type: none"> • The structure of cyberspace creates new powers and changes the meaning of those who are empowered. • Things in real space can be transformed into digital information through transmission and uploading. • Actions in cyberspace can also become actions that have meaning in real space. • Referring to the concept of “network square”, the network is no longer just information, but, gradually, the network will become the world.

Table 4. Cont.

Web Version	Viewpoint	
	Author	Relevant Research Contents
2.0 3.0	W-C Hong (2022) [18]	<ul style="list-style-type: none"> Human society will shape a virtual space/metaverse that is “parallel” to the physical world. The American Foundation for Accelerated Research (ASF) expanded the definition of metaverse to include fully virtual worlds, mirror worlds where external information is integrated into virtual space, life logging where information about activities in physical space is linked to virtual worlds, and life logging where information about activities in physical space is linked to virtual worlds. The metaverse is also used in industrial applications, such as the “sealed universe” and the “augmented reality”, which can display information about the physical environment in the virtual space while moving in the physical space.
	S-Y Peng (2022) [19]	<ul style="list-style-type: none"> Imaginations range from the physical web, to the full-fledged Internet, and to real–digital virtual worlds. The online game Roblox creates virtual worlds where users can freely determine their characters, create stories or products with multiple creative tools, and have a separate currency system. Singers Travis Scott and Ariana Grande have held virtual concerts in the game. The ultimate goal of the immersive experience is to create a virtual world that looks like reality. Meta announced the main plan for the metaverse application “Horizon Worlds”, including Horizon Workrooms, which is a virtual meeting space; Horizon Home, where friends and family can interact; and Horizon Venues, which will be used for events.

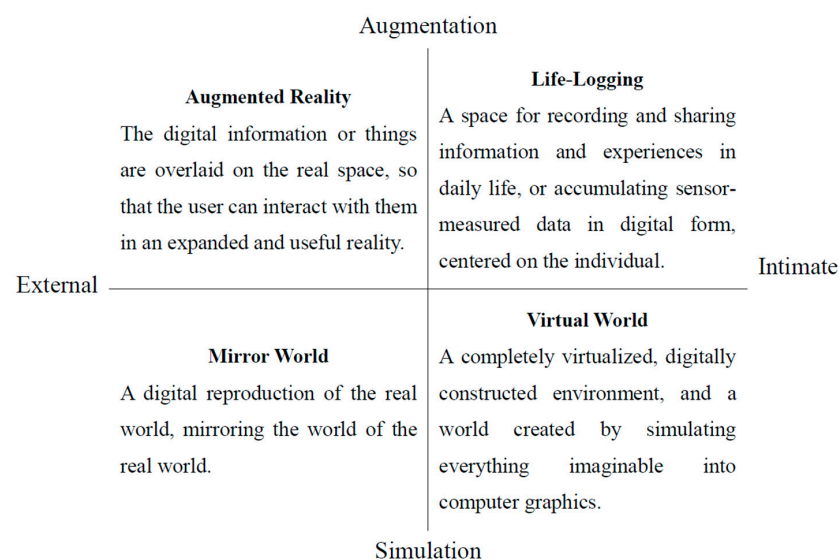


Figure 1. Metaverse blueprint.

It is easy to see that the definition of web space is influenced by the degree of user interaction. In the beginning, in Web 1.0, the Internet was used only as a service, and web space could not replace the existence of real space; in Web 2.0, the behavior of web space may become a behavior with the meaning of real space; and the ambition of Web 3.0 is to

create a virtual space/metaverse that is “parallel” to the physical world. The ultimate goal of an immersive experience is to create a virtual world-like reality. With the progress of the times and the participation of users, the existence of space on the Internet has become an indisputable fact.

3. Research Method

Based on the literature review, the attributes of the sense of place, and the applicability of the cyberspace survey, a questionnaire survey was conducted as the research tool. The participants in the questionnaire survey were university students. In total, 12 social media platforms were selected, including Dcard, Facebook, Instagram, Line, Messenger, Pinterest, TikTok, Twitter, WeChat, YouTube, Zenly, and Little Red Book. The questions were used to understand users' current use of social media and spatial cognition measurements. The correlation was analyzed with the chi-square test to explore whether the human emotion of space, as described in the sense of place, can also be applied to online space (Figures 2 and 3).

The questionnaire was designed using a 7-point Likert scale with scores of 0, 1, 2, 3, 4, 5, and 6 from low to high based on Shamai's classification of the sense of place into low, medium, and high levels. One level was allocated for no sense of place (level 0) (Table 5).

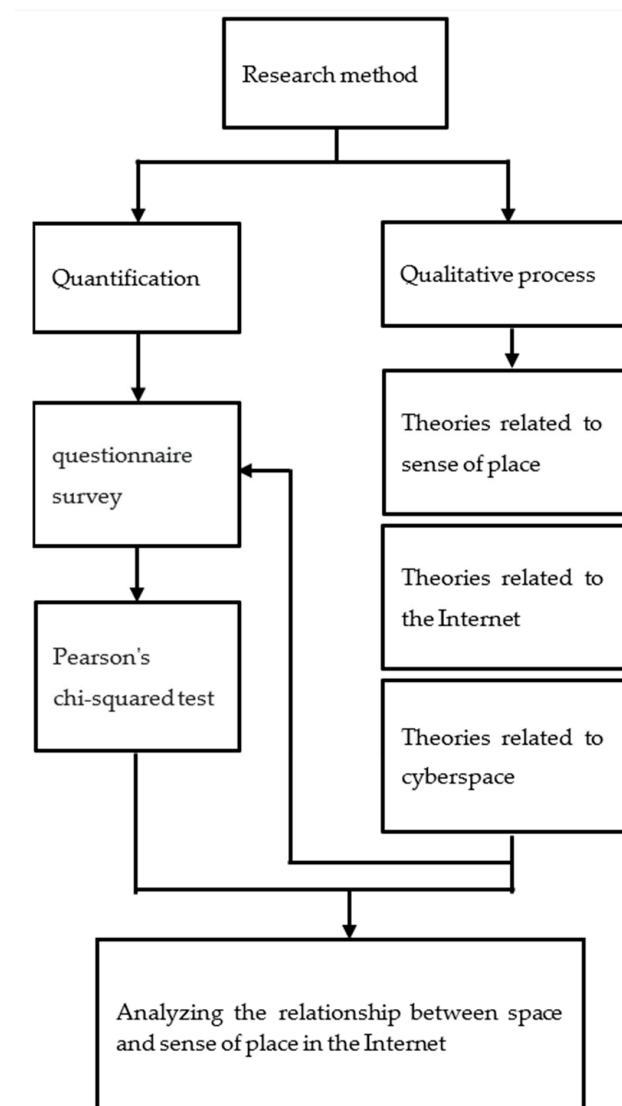


Figure 2. Research flow.

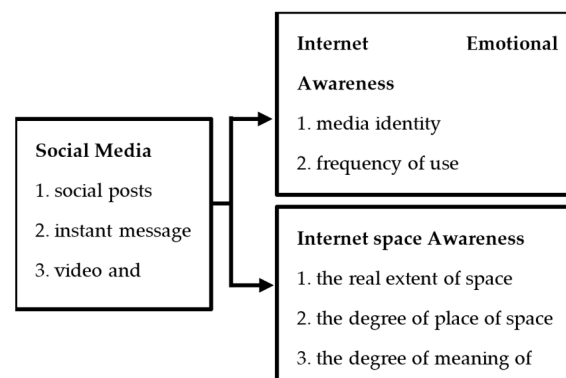


Figure 3. Research framework.

Table 5. Theory of correlation between questionnaire nouns and sense of place and Likert scale correspondence.

Terminology	Questionnaire Design	
	Corresponding Sense of Place Theory	Likert Scale
Media identity	Place identity	(low) 0 1 2 3 4 5 6 (high)
Media dependence	Place dependence	(low) 0 1 2 3 4 5 6 (high)
Frequency of use	Time	(low) 0 1 2 3 4 5 6 (high)
Sense of event reality	Experience	(real) 0 1 2 3 4 5 6 (virtual)
The real extent of space	Space	(real) 0 1 2 3 4 5 6 (virtual)
The degree of meaning of space	Place	(space) 0 1 2 3 4 5 6 (place)
Importance	Meaning	(low) 0 1 2 3 4 5 6 (high)

We selected the social media platforms that repeatedly appeared on the list for this survey of the online space based on five reports on the popularity of social media published every two months from June 2021 to February 2022. The following table shows the cumulative number of times each social media platform appeared in the rankings and the final selection of the 12 study samples (Table 6).

Table 6. Social media ranking list.

Ranking	Social Media	Number of Appearances
1	Dcard	4
2	Facebook Meta	4
3	Instagram	3
4	Line	3
5	Messenger	3
6	TikTok	3
7	Twitter	3
8	YouTube	3
9	Zenly	3
10	Pinterest	2
11	WeChat	2
12	Xiaohongshu	2

4. Research Results

The results of Pearson's chi-square test on the relevance of Social Media in Internet Emotional Awareness and Web space awareness among 418 university students are as follows.

Table 7 shows significant correlations between social media and other factors, except for "sense of event reality (0.590)" and "the degree of meaning of space (0.666)". Tables 8–11 show that the social media post type has intermediate "media identity (56.40)" and "frequency of use (36.30)" and high "media dependence (−72.80)". The instant message type has intermediate "frequency of use (−43.70)" and high "media identity (−44.30)". The video and audio information type had low "frequency of use (−37.80)" and high "media identity (33.50)" and "media dependence (57.70)". Table 11 shows that spatial perceptions are still mainly in favor of real space.

The survey asked about the relevance of social media to the users themselves, as well as what people think it means to turn "space" into "place" on the Internet and how important doing so is to them. Except for "privacy", "dependency", "immersion", and "Amount of information", all measures were viewed as significant (Table 12), i.e., Interaction (41.20)", "anonymity (−72.80)", "identification (34.20)", "sense of life (30.20)", and "special experience (−49.80)".

Table 7. Results of chi-square test.

Social Media	Media Identity	Frequency of Use	Media Dependence	Sense of Event Reality	Real Extent of Space	Degree of Meaning of Space
Pearson's cardinality	45.240	35.380	55.327	2.812	18.917	2.383
Degrees of freedom	6	6	6	6	6	6
Asymptotic significance (two-tailed test)	0.000	0.000	0.000	0.590	0.001	0.666

Table 8. Results of goodness-of-fit results table (media identity).

Media Identity	Social Posts			Instant Message			Video and Audio Information		
	fo	fe	fo-fe	fo	fe	fo-fe	fo	fe	fo-fe
Low	357	356.7	0.30	311	285.3	25.70	188	214	−26.00
Intermediate	671	614.6	56.40	468	491.7	−23.70	336	368.8	−32.80
High	815	804.2	10.80	599	643.3	−44.30	516	482.5	33.50
Significance		0.000			0.003			0.008	

Table 9. Result of goodness-of-fit results table (frequency of use).

Frequency of Use	Social Posts			Instant Message			Video and Audio Information		
	fo	fe	fo-fe	fo	fe	fo-fe	fo	fe	fo-fe
Low	402	367.9	34.10	298	294.3	3.70	183	220.8	−37.80
Intermediate	523	486.7	36.30	361	389.3	−28.30	284	292	−8.00
High	795	795.8	−0.80	616	636.7	−20.70	499	477.5	21.50
Significance		0.001			0.035			0.020	

Table 10. Result of goodness-of-fit results table (media dependence).

Media Dependence	Social Posts			Instant Message			Video and Audio Information		
	fo	fe	fo-fe	fo	fe	fo-fe	fo	fe	fo-fe
Low	419	371.7	47.30	293	297.3	−4.30	180	223	−43.00
Intermediate	599	527.1	71.90	378	421.7	−43.70	288	316.3	−28.30
High	586	658.8	−72.80	542	527	15.00	453	395.3	57.70
Significance		0.000			0.056			0.000	

Table 11. Result of goodness-of-fit results table (the real extent of space).

Real Extent of Space	Social Posts			Instant Message			Video and Audio Information		
	fo	fe	fo-fe	fo	fe	fo-fe	fo	fe	fo-fe
Close to the real space	511	528.3	−17.30	451	396.4	54.60	268	305.4	−37.40
In between	590	581.1	8.90	401	436	−35.00	362	335.9	26.10
Close to virtual space	641	632.6	8.40	455	474.7	−19.70	377	365.7	11.30
Significance		0.666			0.004			0.031	

Table 12. Results of goodness-of-fit results table (importance).

Importance	Interactivity			Anonymity			Privacy		
	fo	fe	fo-fe	fo	fe	fo-fe	fo	fe	fo-fe
Low	41	57.6	−16.60	87	57.6	29.40	57	57.6	−0.60
Intermediate	129	143.7	−14.70	171	143.7	27.30	140	143.7	−3.70
High	244	202.8	41.20	130	202.8	−72.80	204	202.8	1.20
Significance		0.000			0.000			0.861	
Importance	Dependency			Identity			Immersion		
	fo	fe	fo-fe	fo	fe	fo-fe	fo	fe	fo-fe
Low	61	57.6	3.40	46	57.6	−11.60	62	57.6	4.40
Intermediate	138	143.7	−5.70	128	143.7	−15.70	132	143.7	−11.70
High	209	202.8	6.20	237	202.8	34.20	213	202.8	10.20
Significance		0.624			0.004			0.485	
Importance	Sense of Life			Amount of Information			Special Experiences		
	fo	fe	fo-fe	fo	fe	fo-fe	fo	fe	fo-fe
Low	43	57.6	−14.60	51	57.6	−6.60	70	57.6	12.40
Intermediate	135	143.7	−8.70	151	143.7	7.30	169	143.7	25.30
High	233	202.8	30.20	202	202.8	−0.80	153	202.8	−49.80
Significance		0.007			0.770			0.000	

For the question “Is there anything about “spaces and places on the web” that you think is important that was not mentioned in the questionnaire”, there were interesting answers, such as “Satisfaction with use (you want to use it only if it works well)”, “Strong rules to limit malicious speech, greater mobilization and rapid dissemination of information”, “I actually think the Internet has a certain degree of “influence”, “I think immersion and life sense should be included in the definition of place,” and “information of a pedagogical

nature teaches users the right concepts". These responses showed that users were concerned about the products provided on the Internet, whether in terms of influence or the accuracy of the content, or whether it is smooth to use. Thus, creating a free, but not overly free, space is a potentially important message.

5. Conclusions

The cyberspace of "instant message" and "video and audio information" is "close to the real space". Social media of the instant messaging type is a tool that people use to communicate with each other in their daily lives. Therefore, people are in favor of real space. The bulk of video and audio information is available, which reflects the same situation as an instant message. It is possible that the "social posts" do not fully reflect which type of space is preferred, as people post a variety of content from places of work and study about leisure, video games, animation, and other hobbies. The social media platforms of social posts are not as limited; thus, there are unlimited possibilities in the exploration of "cyberspace". In view of this fact, it is suggested that when developing or establishing various spaces in the online world, we should challenge people to communicate with each other in a virtual world, which is different from the appearance of the real world, to enhance people's view of cyberspace as a virtual space, rather than as an auxiliary tool of the real world. As for the answer to the question of whether the space in the web has a sense of place, cyberspace needs to achieve further steady development. Subsequent research is necessary for the investigation of other types of cyberspace, as this can ensure that more spaces can be identified.

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