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A Study on User Empathy Composition Factors of Digital Media

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Abstract

Industrialization and rapid technological development brought about diversification of the product market. Therefore, this study aims to clarify the constituent factors of empathy that give emotional satisfaction in digital media devices, and to investigate the characteristics of empathy factors by conducting qualitative and quantitative studies in parallel. As a result of the study, users were identified as five factors: Usability, Emotion, Stability, Interest, and Bond. The results of this study can be usefully used as an index on how to increase empathy for users in digital media to satisfy their emotional satisfaction. In addition, as the digital media market is gradually expanding, it is expected that it can be used as a useful framework in both academic and practical aspects.

Keywords: Empathy, Digital media, Factor analysis, User experience, Empathy scale

1. INTRODUCTION

1.1. BACKGROUND AND PURPOSE OF THE STUDY

High quality digital media products that provide better possibilities and experiences by cutting-edge technologies are competitively appearing. Moreover, various digital media contents are produced due to the spread of internet culture, the development of IT, the conversion to mobile and the activation of network.

As quantitative and qualitative aspects of products are exponentially improved thanks to the industrialization and rapid technology development, markets have become diversified, and products with consumers' demands reflected have emerged. Some products fail in the market even though they fully reflect consumers' functional demands. This is because consumer emotion, which is another requirement, is not considered enough.

With gradual upward leveling of products and service manufacturing technologies, users want more than usability, so products should provide not only functional satisfaction but also emotional satisfaction to users for their optimal experiences.

Emotion has been a major research subject in the philosophy and psychology fields as the internal action of humans. However, the emotion system is closely related to behaviors in that it affects all decision making in the purchase and use process of products and prepares for human body reactions for each given circumstance. Nevertheless, studies so far have ignored the emotional aspect about users' experiences.

Therefore, studies on emotion shouldn't be limited in philosophy and psychology, but should be extended to the digital media field, so that there can be the discovery of contents and related research that consumers can empathize emotions and situations through active interactions with objects. Especially in the world where there is an ample amount of information, and analytic tools are advanced, the access with rational logic is not sufficient. There should be differentiation.

Consumers of modern times prefer things that are similar to them and favorably react towards consistency with their own identity. The empathy, which is a tendency to project themselves to the objects of

awareness, is appearing as a core keyword in the society[1]. Therefore, the ability to understand users' emotions, to reinforce bond and to have thoughtfulness can be elements of differentiation.

The empathy phenomenon have an influence on various areas such as online contents, people's behavior changes and economic phenomena, and the way of communication among people and the methods and contents of empathy are changing due to the rapidly changing information technology. Therefore, empathy can be considered as an essential element in future design.

Especially in the digital media, users' forming empathy means the formation of experiences by the interaction between the interface of the connected device and users, so it is space where the communion with users must be done. The objects for communion exist not only in the contents themselves but also in the services that provide the contents, which provide experiences differentiated from the conventional media or face-to-face experiences. The empathy does not stay just in the internal area as in the past, but functions as a practical force to change the world through emotional communications with others using new technologies and tools. Thus, the contents empathy experiences according to how well producers deliver experience goal not only affect individual users but also possibly expand to the extended concept of user groups. The empathy in the user experiences, in which the communication with users is the main point, has critical significance in contents themselves and services that provide the contents.
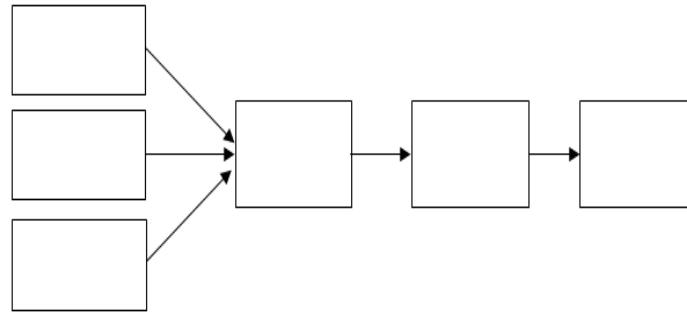
The existing empathy scale doesn't measure correctly, the measuring components are not clear, and the measuring components are not stably deduced. Therefore, it is necessary to develop empathy components that fully reflect the characteristics of convergence media in the user experience design field of digital media.

This study is intended to conceptualize user empathy experiences through precedent studies and to deduce empathy components that can reflect the conceptualized empathy experiences to digital media devices variously and faithfully.

1.2. RESEARCH METHOD

In order to derive the constituent factors of empathy, this study first examined the preceding studies in various fields on the constituent factors of empathy. In addition, a focus group interview was conducted for 30 minutes per group by consisting of 5 groups of 7 students each of 20 college students who are familiar with the use of digital media, have a lot of exposure experience, and have a relatively high understanding of new media compared to other classes. Because it is a useful method for acquiring rich data and insights by discovering rapidly changing users' digital media usage patterns. Finally, interviews with experts in the UX field were conducted to collect opinions on aspects that should be considered important for the constituent factors of empathy. In order to derive the constituent factors of empathy in digital media, quantitative and qualitative data were arranged to establish the criteria for deriving factors. Based on this criterion, a questionnaire survey was conducted to finally extract the factors that constitute empathy in digital media. This study is intended to conceptualize user empathy experiences through precedent studies and to deduce empathy components that can reflect the conceptualized empathy experiences to digital media devices variously and faithfully.

Fig. 1 Methods for extracting empathic factors from digital media

2. THEORETICAL BACKGROUND

2.1. THE CONCEPT OF EMPATHY

Empathy is has been a core subject in such research fields as psychology and pedagogy for a long time, and there have been a number of studies on the concept. The lexical meaning of empathy is the feeling to understand and share the feelings, opinions or claims of another[2].

Regarding scholars'definitions of empathy, Wispe(1986) said it is the state that another person's mentality or his or her situation is understood to the maximum, and basically it starts with recognition of another person's feelings. Escalas& Stern(2003) said it is a state that another person's feelings are perceived as one's own feelings. Batson(2009) explained the concept about empathy with the following eight categories: 1) knowing another's inner state including thoughts and feelings, 2) copying another person's behaviors or emotion expressions in spite of oneself, 3) feeling what another person feels, 4) projecting oneself into another person's situation or having an intuition, 5) imagining how another person feels and thinks, 6) Putting oneself in another's shoes and imagining the person's feelings and thoughts, 7) witnessing another's pain and feeling the pain(empathic distress), 8) feeling sympathetic towards a person who experiences pain. In summary, empathy is a state that another's feelings are recognized as one's own feelings.

Coplan(2011) defined empathy into three elements: 1) imagining the same emotion situation with another's and corresponding with the person's emotion, 2) instead of one's own position, taking another's view from the person's perspective, 3) maintaining clear conscious boundary between oneself and another. Lim Da-hye(2013) considered empathy as an emotional reaction of understanding another's feelings and being immersed in the person's mental situation and circumstance, and Yun Dae-hong(2014)defined it as a state of being emotionally immersed in relevant contents and feeling and sharing them like same experiences.

When the above scholars' definitions of empathy are summarized, it is the ability to recognize and understand another's emotion accurately and to show proper responses, and the empathy ability is to respect and understand other people's emotions.

2.2. COMPONENTS OF EMPATHY

Regarding the components of empathy, there are various perspectives that scholars interpret. According to precedent studies, the components of empathy can be broadly classified into cognitive empathy and emotional empathy.

The cognitive empathy is a state of understanding the perspectives and situations of an object and agreeing the meaning. Feshbach(1978) defined the cognitive empathy as 'reasoning another person's perceptual tendency and action and taking part in more other-oriented level from the person's position and perspective'. The cognitive empathy is the ability to understand another's inner condition from individual's intellectual level, which enhances adaptive behaviors of considering another[3]. In addition, as one perceives and accepts another from the person's perspective, he or she can increase the understanding level on the person and could comprehend what the person wants.

The emotional empathy is a state of not only understanding another's situation but also reaching deep emotional immersion that one feels as if he or she was experiencing the situation directly. Davis(1983) defined the emotional empathy as the ability to have and share vicarious emotional experience by corresponding oneself with another's emotional experience. In addition, the emotional empathy is the act to perceive meanings, contents and relations connoted in another's verbal and non-verbal expressions through imaginary sharing of the person's experiences. Eventually, the emotional empathy makes another understand better through the vicarious experience or sharing of the person's emotion, and leads to thoughtful behaviors in interpersonal relations[4].

Therefore, the emotional empathy can be regarded as more advanced empathy than the cognitive empathy. While the cognitive empathy is the ability to understand another's behaviors from the person's perspective, the emotional empathy is the vicarious experience of another's emotions. According to Shamay-Tsoory et al.(2009), the crucial difference between the two types of empathy is that the cognitive empathy is the ability to understand another's perspective cognitively, but the emotional empathy includes the sharing of emotions. While some scholars view the cognitive empathy and the emotional empathy separately, others view these as a process or stage from the perspective of correlation. The following Table 1 is the empathy components of each scholar.

Table 1. Factor of empathy

Concept definition	Factor of empathy	Scholar
He understood the empathy reaction in advertising step by step from the cognitive empathy response to the emotional empathy response. In addition, the correlation between each process was analyzed, and as a result, it was suggested that emotional empathy can be reached through behavioral reactions such as interaction from cognitive empathy.	-Cognitive empathy: attractiveness, familiarity, practical/ideal self-consistency, sympathy -Behavioral empathy: identification, interaction -Emotional empathy: empathy, immersion, attachment	D. H. Yun (2014)
Brand empathy was defined as a concept that included both emotional and cognitive empathy, and viewed the two as independent variables without dividing them into stages.	-Cognitive empathy: the degree to which you understand and agree with your brand's thoughts, emotions, and intentions -Emotional empathy: The degree of emotional reaction to the emotions experienced by others or situations in relation to the brand.	A. Y. Cho (2015)

Empathy was classified into cognitive/emotional/behavioral empathy, and the study focused on identifying the factors that reach behavioral empathy, which is a direct response of consumers, rather than the correlation between cognitive empathy and emotional empathy.	-Cognitive empathy: attractiveness, familiarity, self-congruity -Emotional empathy: immersion, attachment, identification -Behavioral empathy: interaction, purchase intention	E. J. Wi (2017)
Empathy was identified as having multidimensional characteristics including cognitive and emotional elements, and an empathy scale was created by dividing it into two sub-factors for each element.	-Cognitive empathy: taking perspective, imagining -Emotional empathy: empathic interest, personal suffering	Davis, M. H. (1980).

The components of empathy include perspective-taking, recognition of emotion, and role-taking. The perspective-taking is a process of evading egocentrism to understand another's perspective and attitude. It is the ability to view and understand an incident or object from the person's perspective(Davis, 1980; Selman,1980).

The recognition of emotion is the ability to discern another's emotional state. To recognize another's emotion accurately, it is necessary to be sensitive in verbal contents, situational clues and nonverbal clues[5].

The role-taking is the ability to take another's role and to take alternative views[6]. Regarding empathy mentioned from the cognitive perspective, Mead(1934) defined empathy as 'the ability to take another's role and view alternative perspective', highlighting the aspect of role-taking. Hoffman(1977) considered the cognitive empathy as the ability to express another's emotions such as thought, intention and desire, and Smith(2006) viewed as 'the ability to take another's role and to view it from the alternative perspective'.

The emotional components are emotional resonance, vicarious emotion, empathic concern and personal distress. The emotional resonance is the emotional response occurring contagiously, and is a phenomenon that humans universally experience. The name derived from the resemblance of resonance in the physics as one person's emotion can be conveyed to another person in the same way[7]. This emotional resonance was verified as the mirror neurons were discovered in human brain[8], and human brain is highly specialized in emotional communion, automatically responses to another's emotions by the cortex area called mirror neuron[9].

The vicarious emotion is the experience another's emotion despite the inconsistency[10]. Hoffman(2011) defined the vicarious emotion as the experience of another's emotional state as an affective response more suitable for the person rather than oneself. Eisenberg and Miller(1987) defined it as the emotional state of feeling the same as another's caused by the understanding of the person's emotional state and condition. Bryant(1982) viewed it as recognizing another's emotional experience and responding it emotionally and vicariously. In the definitions of Eisenberg & Miller(1987) and Bryant(1982), the understanding of another and the awareness of the person's emotional state are premised. In the definition of Hoffman(2011), it is assumed that understanding another's situation should be accompanied for proper emotional response of another's situation. Therefore, the vicarious emotion is emotional response appearing with the understanding of another's situation, and can be defined as the experience another's emotion for suitable situation although it is not the same.

Meanwhile, the empathic concern raised by Davis(1980) means the tendency to feel other-oriented sympathy and to have concern about an unhappy person. The personal distress defined by Davis(1980) is the tendency to feel uncomfortable about another's unhappiness and distress and to feel distressed. Nevertheless, some scholars(Baron-Cohen & Wheelwright, 2004; Lawrence et al., 2004)) argue that this concept can't be considered as the measurement of empathy.

As shown above, the concept and components of empathy have been mostly studied in the philosophy and psychology, and they have an influence on various academic fields as emotions and use experiences of consumers are gradually empathized. However, empathy related studies that can be applied to digital media are not sufficient, and the existing studies about empathy components are not related to digital media, so it is difficult to reach the evaluation results for objective empathy. Therefore, it is necessary to analyze empathy components that can objectively apply to the empathy in digital media.

3. RESULTS

3.1. COLLECTING FACTORS OF EMPATHY ATTRIBUTE OF DIGITAL MEDIA

In order to derive the questionnaire for measuring the factors of empathy in digital media, this study first looked at previous studies related to empathy in the fields of psychology, advertising, digital media, and HCI. Based on these previous studies, 21 items that can be measured as empathy factors reflecting the characteristics of digital media are extracted as shown in Table 2.

Table 2. Items of empathy factors through prior research

	Empathy factor	Literature
Cognitive empathy	Attractiveness	D. H. Yun (2014), E. J. Wi (2017)
	Familiarity	D. H. Yun (2014), E. J. Wi (2017)
	Practical/ideal self-consistency	D. H. Yun (2014), E. J. Wi (2017)
	Sympathy	D. H. Yun (2014), A. Y. Cho (2015)
	Thinking about the brand	A. Y. Cho (2015)
	Affect	A. Y. Cho (2015)
	Understand	A. Y. Cho (2015)
	Emotion recognition	Lipps (1903)
	Role-taking	Lipps (1903), Hoffman (1976)
	Fantasy	Hoffman (1976)
Emotional empathy	Sympathy	D. H. Yun (2014)
	Immersion	D. H. Yun (2014), E. J. Wi (2017)
	Attachment	D. H. Yun (2014), E. J. Wi (2017)
	Identification	E. J. Wi (2017)
	Agency sentiment	A. Y. Cho (2015)
	Shared feeling	Davis (1980), Hoffman (1976)
	Empathic concern	Hoffman (1976)
	Personal distress	Hoffman (1976)
Behavioral empathy	Identification	D. H. Yun (2014)
	Interaction	D. H. Yun (2014), E. J. Wi (2017)
	Purchase intention	E. J. Wi (2017)

Next, we organized 5 groups of 7 students each in their 20s, who are familiar with the use of digital media, have a lot of exposure experience, and have a higher understanding of new media than other classes. Afterwards, focus group interviews were conducted for 30 minutes per group. The interview was conducted on December 10, 2019. Participants in the experiment were asked the following questions, and they were asked to answer them comfortably. 'Did you ever feel that you are empathizing with the media when using digital media?', 'In what situations do you feel that way?'. As a result of the interview, 25 items were drawn as shown in Table 3.

Table 3. Empathy factor items through focus group interview

Preference, Learning, Sympathy, Emotion, Novelty, Understanding, Familiarity, Caring, Exchange, Communication, Interaction, Sympathy, Memory, Sharing, Experience, Interest, Adaptation, Immersion, Identification, Usefulness, Prediction, Reaction, Personalization, Comfort, Liking

Finally, interviews with experts in the UX field (1 professor, 1 designer) were conducted, and opinions on various criteria that should be considered important for deriving the attributes and lower dimensions of empathy in the user experience are shown in Table 4. It was organized into 5 items together.

Table 4. Items of empathy factors through expert interviews

Usability	Aspects of how well media can be used
Intention of use	Intention to continue using the medium
Curiosity	A new, mysterious, and wanting to know about the media
Trust	The aspect of how stable and reliable the medium is
Belonging	The medium and I feel as one

Through this process, finally, 21 items for measuring empathy factors through prior research in Table 2, 25 items for measurement extracted by focus group interview in Table 3, and 5 items in Table 4 by expert interviews. Redundant or similar concepts have been integrated, and factors that are difficult to see as sympathetic factors of digital media have been deleted. As a result, the final 31 items were derived as shown in Table 5.

3.2. THE RESULT OF EXTRACTING FACTORS OF EMPATHY ATTRIBUTE OF DIGITAL MEDIA

The sympathetic factors of the 31 digital media collected were composed of questionnaire questions, and sentences of items that were difficult to understand meaning were easily interpreted and used to help participants understand.

The survey was created using a web survey system, and responses were made on a likert 5-point scale. As shown in Table 5, all 31 items recorded a score of 3 or more corresponding to "a little yes" in the 5-point Likeard scale, and it was judged that it would be easy to extract them as a sympathetic factor.

The survey participants were men and women in their twenties who are familiar with digital media. A total of 114 surveys (53 men and 61 women) were collected from September 16 to September 22, 2020. Descriptive statistics and factor analysis were performed using the SPSS program for statistical processing of data obtained through questionnaire surveys to derive sympathetic factors.

Table 5. Mean value of items of empathy factor in digital media (N=114)

Number	Item	mean value
1	Preference	3.65
2	Learning	3.68
3	Novelty	3.61
4	Consideration	3.32
5	**Communication**	**4.08**
6	Memory	3.97
7	**Share**	**4.19**
8	Experience	3.92
9	Curiosity	4.02
10	Adaptation	3.74
11	**Immersion**	**4.06**
12	**Usefulness**	**4.12**
13	Prediction	3.54
14	Reaction	3.89
15	Personalization	3.51
16	Comfort	3.85
17	Liking	3.80
18	Attractiveness	3.96
19	Familiarity	3.85
20	Ideal self-consistency	3.20
21	Sympathy	3.56
22	Affect	3.56
23	Understand	3.70
24	Emotion	3.74
25	Attachment	3.44
26	Belonging	3.47
27	Trust	3.46
28	Shared feeling	3.62
29	Interaction	3.97
30	**Usability**	**4.03**
31	Intention of use	3.95

A factor analysis was conducted to derive the sympathetic factors of digital media, and as a result, five factors were extracted as shown in Table 6.

As a result of extracting five factors, 68.64% of the total variance is explained, and when it is judged that an item representing a factor load of 0.3 or more is included in the factor, the empathy attribute of a digital medium consisting of a total of 31 questions is 5 It can be seen that it is composed.

In order to examine the consistency and accurate measurement of the items constituting the five sympathetic factors, the reliability of the items constituting the factors was examined (Table 6). The reliability of the items constituting factor 1, factor 2, factor 3, factor 4, and factor 5 is 0.929, 0.907, 0.885, 0.891, 0.793, and 0.808, respectively. There was no problem with the reliability coefficient of the case.

The empathy factors of digital media finally derived through factor analysis and reliability verification were named as ease of usability, emotion, stability, interest and bond, and each factor and meaning were defined as follows.

Table 6. The result of analyzing the factors of empathy in digital media

Item	factors 1	factors 2	factors 3	factors 4	factors 5	reliability
	Usability	Emotion	Stability	Interest	Bond	
Usability	.735					
Usefulness	.711					
Memory	.678					
Intention of use	.675					
Reaction	.596					.929
Interaction	.583					
Understand	.542					
Comfort	.470					
Adaptation	.466					
Emotion		.760				
Immersion		.694				
Liking		.683				
Attractiveness		.601				
Curiosity		.594				.907
Familiarity		.593				
Shared feeling		.556				
Affect		.518				
Ideal self-consistency			.753			
Trust			.737			
Prediction			.645			
Consideration			.635			.885
Belonging			.622			
Attachment			.596			
Sympathy			.553			
Novelty				.673		
Learning				.610		.793
Preference				.574		
Personalization					.733	
Communication					.631	.808
Share					.503	
Experience					.402	
Eigenvalue	5.594	4.983	4.810	3.364	2.527	
KMO(Kaiser-Meyer-Olkin) .916						
Bartlett's test of sphericity test			Chi-Square 2879.528			
			df(p) 465(.000)			

1) Usability

It is effective and efficient in achieving the purpose by using digital products or services, so that users can increase satisfaction.

2) Emotion

It is a subjective concept as opposed to reason, and it represents the feelings and mood arising from using digital media.

3) Stability

Makes users predictable in their use of digital media, by maintaining a certain state, it gives you trust and makes you feel comfortable.

4) Interest

It is the fun that users feel when using digital products or services, and it is accompanied by an attracted feeling.

5) Bond

When users use digital products or services, they have a common feeling that they are closely connected to the medium.

4. CONCLUSION AND SUGGESTION

Due to the advent of today's convergence media, it is meaningless to discuss media use behaviors in the frame of individual media. In other words, it is time for new conversion from individual media analysis to convergence media analysis.

However, the existing studies have been done on limited media, which can't explain the situations of various and complicated communication media use comprehensively. In addition, theories about individual media use have limitation as they explain users' media choices very identically. Thus, there is a need for a new perspective on the relations among media, users and contents, along with the need to consider various usage-contextual factors that affect users' media uses.

This study is intended to deduce user empathy components of digital media and to utilize them for the index of user satisfaction and performance in order to improve user experiences of digital media.

In the research results, five components (usability, emotion, stability, interest, bond) are finally deduced among many factors. As sharing has the highest average value followed by usability, communication, immersion, utilization among 31 digital media empathy components, it is confirmed that the emotional empathy functions as an element that strongly appeals young users, and that there is a desire for practicality.

These research results show that it is necessary to sublate mutually exclusive access among academic fields, but to intensify and expand academic foundations through convergence research among various fields such as design, psychology, business administration and industrial engineering. The convergence of the knowledge of science & technology with humanities & social science, and culture & art can accomplish creative innovations from the conventional ways and can solve problems that haven't been solved or have appeared newly about user experiences. In addition, it can contribute to creating new concept of empathy contents, so that effective opportunities to connect studies and economic society can be provided.

It can also be used for a useful index to analyze digital media related data and to maintain and enhance user participation. Through this, it can be used as a useful frame in the academic and practical aspects by playing a part in expansion of the digital media market.

Nevertheless, this study has a limitation that the completeness level is not satisfactory due to the lack of empathy related precedent studies in the user experience and information technology fields. Therefore, follow-up study needs to expand the empathy attribute of digital media on various generations by improving this limitation.

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