

# Is Social VR Possible to be the New Journalism? the Effects of Other Users' Opinions on the Attitude and Perception of Public Opinion When Consuming Contents in VR

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**Abstract Background/Objectives:** Currently, it is the consumer journalism era in which the media consumers have effects on articles by actively suggesting their opinions, based on the technical development. Under this circumstance, this study aimed to provide a new method in which VR(Virtual Reality) consumes the media, and also to verify the possibility of becoming a new place for communication..

**Methods/Statistical analysis:** Targeting total 40 ordinary people in Seoul, an experiment was conducted in four situations(wearing of HMD vs non-wearing\*checking of chatting room vs no checking). The subjects were asked to fill out the questionnaire after reading all the article and chatting, and based on the results, the differences in the evaluation of the article between experimental group and control group were verified by using the one-way ANOVA.

**Findings:** In the results of the experiment, the chatting with residents had effects on the evaluation of the article while the matter of wearing HMD did not show the moderating effects. In other words, in case of being exposed to opinions against the contents of the article, the news consumers would have more negative perception of the article. However, the matter of wearing HMD did not mediate the effects of other users' opinions on the attitude toward the article in VR.

**Improvements/Applications:** The possibility of changes in the media use pattern could be suggested to media consumers. And the possibility of creating the new business models through the two-way communication of news could be suggested to the press. Also, to the policy makers and marketers, the opinions of VR could be used as a barometer for understanding the public opinion of consumers and people.

**Keywords:** Effect of presumed media influence, News Attitude, Perceived Public Opinion, VR, Social VR

## I. INTRODUCTION

Owing to the technical development and the appearance of new media, the consumption of news is diversely changed. The public that used to consume the news contents only through newspaper or regular broadcasting, could receive news from diverse channels based on internet or mobile infrastructure. As the use of news contents through internet

portals is generalized, and news is reproduced through SNS, the paths for receiving news have been expanded, and diverse news distribution channels are generated. Especially, when the mediators of news could suggest their opinions through internet comments or SNS, the pattern of media consumption that used to passively and unilaterally accept news was gradually changed to the two-way and active pattern, which became a chance for the media consumer journalism to appear.

However, in spite of the development of media channel and the changes in the news media pattern, there are still limitations for consumers to freely communicate and also to interactively use the media for news contents. For example, in the comments of internet articles, only fragmentary and limited opinions could be expressed through a single-line comment. As it is even written based on ID instead of real name together with people without interpersonal relationships, irresponsible opinions and comments are frequently shown. Even though people express their opinions and aim for the online communication through the method of sharing internet news in SNS such as twitter or facebook, it is not developed into free communication or discussion.

Under this circumstance, the VR(Virtual Reality) has the possibility of providing a new method of consuming the media and also establishing a new place for communication. As the category of virtual world is gradually expanded closely to daily life, it is highly possible to be used as a path for receiving news articles. In reality, after understanding this possibility, the global media groups such as Reuters, CNN, and BBC are attempting to distribute articles through VR, with the use of channels like Second Life.

The biggest characteristic of media consumption through VR is that many people can consume the media at the same time. It is not that individuals passively receive the media alone, but that individuals receive the same news at the same time with neighboring users, and also communicate and share opinions with them. In this media consumption pattern, individual opinions exercise the opinion influence to articles and issues, and these opinions have effects on other residents, which could generate a new journalism.

Therefore, this study aims to understand if Social VR could become a new journalism media, by examining the effects of

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communication with other residents on the attitude toward articles and perception of public opinion when receiving articles in VR, and also understanding the media effects in Social VR.

## II. LITERATURE REVIEW

The media has huge effects on the formation of public opinion and the generation of changes in attitude, and there have been diverse researches on such media effects. According to the "influence of presumed media influence"[1] in the absence of direct information that could measure the media effects, people mostly presume that the media exercises the important influence to the public opinion, and under this presumption, they tend to change their attitudes or behaviors. For example, an adolescent receiving a non-smoking campaign believes that other friends exposed to the campaign would have more negative attitude toward smoking, and also believes that he/she would have more negative attitude toward smoking as well. Thus, the adolescent also takes more negative position on smoking[2]. Similarly, there are the results of a research showing that the ordinary people who listened to an educational radio campaign for medical practitioners believed that the service of medical practitioners as the main target of the campaign would be improved even when nothing was actually improved, and then evaluated the treatment of their doctors in charge more positively[3](Gunther & Storey, 2003).

However, the media effects are not only shown in the unilateral acceptance from the media, but also largely shown by other consumers' responses in the process of consuming the article. There are the results of a research showing that the response of other media consumers could have effects on the cognitive or behavioral response to the media contents. For example, in case of containing the recorded laughing sound when watching an entertainment program, even though it was not the response of actual viewers, the viewers who watched this considered the relevant program more interesting than the case without it, and also laughed more while watching this program[4]. In other words, people's response is interpreted as a signal for informing how much the program is interesting enough to laugh[5].

A study on the selective exposure to news[6] discovered that it would be highly possible for people to select the relevant article as other readers who already read the article showed the positive evaluation of it in case when selecting news in online portal.

If people could have the different evaluation of media messages in accordance with other consumers' responses or have the different expectation of un-read messages, the evaluation of an article could be negatively changed after reading something mainly filled with opinions against the contents of the article. As the social facilitation, this hypothesis accords with the argument[7] that people could have more critical perspective on the article and also have the negative evaluation of the contents of the article as the

perspective of people who read the messages of this article is expanded or additional information is provided.

The biggest characteristic of media contents consumption in VR is that consumers could consume contents simultaneously, suggest opinions about the contents in real-time, and also communicate with each other. And there are the existing researches[8] showing the higher effects of communication through avatars in VR than general chatting, and also showing the high communication effects as much as the exchange of opinions in real life. Thus, it is possible to presume that the influence of presumed media influence would be higher in VR.

Therefore, based on the theories of media effects in the consumers' responses to news articles, this study aims to examine the influence of other users' opinions on the acceptance of news when receiving news articles in VR.

**(Research Question) Do other users' opinions have effects on the attitude toward articles when consuming news contents in VR?**

· **Hypothesis 1. When consuming news contents in VR, the group that read other users' opinions in the argument tone different from the article would have more negative evaluation of the article compared to the group that only read the article.**

In the traditional mass communication, there are no grounds for accurately evaluating the media effects on individual consumers. In other words, in case of reading newspaper or watching TV news, the general consumers do not have the experiential grounds for understanding other people's responses to the relevant article or report. Thus, the news consumers of traditional mass media presume that the message itself of the relevant media would have effects on other people and the public opinion would be the same[9]. However, the VR communication space provides an opportunity to directly and simultaneously check how other news consumers respond to the article. In other words, in the news space within the VR environment that could include the harsh criticism and attack on article contents, argument tone, and value through chatting window or voice talk, the existing presumed media influence that has been taken for granted may not be applicable any more.

Therefore, this study aimed to verify if the news consumers would have different evaluation of the article itself(<Research Hypothesis1>), and also if they would differently perceive the influence of the article on the public opinion, when they were exposed to other users' opinions against the contents of a neutral article.

A previous research[10] considered the communication like comments of internet news as the contents spread through mass media just like news articles, and then examined the perception of the influence of 'comments' on oneself and other people in the theoretical frame called 'the third-person effect'. However, this study aims to understand if the communication with users would cause differences in the perception of opinion leadership of articles exceeding the judgment of news articles(<Research



Hypothesis 2>), by examining how the perception of the influence of 'news article' on oneself and other people could be changed by other users' opinions.

• **Hypothesis 2. When consuming news contents in VR, the group exposed to other residents' opinions against the theme of article would evaluate the influence of the article on the public opinion as lower compared to the group that only read the news article.**

One of the important characteristics of virtual reality experience is the immersion. According to VR experts [11], once a VR user is immersed in the virtual world, he/she becomes an object for her/himself or has other people's viewpoint, and this change in viewpoint through empathy is the characteristic method of interpersonal relation of virtual reality and also the method of knowledge acquisition. Thus, the type of virtual reality could be largely divided into immersive VR and non-immersive VR. In the form of using HMD as output device, and using joystick, location tracking device, and data globe as input device, the immersive VR maximizes the immersion by letting users view just the virtual world after blocking the external environment. The non-immersive VR is to interact with the use of mouse, joystick, or data globe while watching the solid image shown on the computer screen or large screen. Compared to the immersive VR, the sense of reality might be lower while it could be used for cheaper cost. However, the boundary of this classification has been collapsed as the VR devices like Oculus Rift were popularized, and the complementation of software that could use all the contents of non-immersive VR as HMD was conducted based on the technical development. The Second Life as the representative non-immersive VR contents of Linden Lab also changed its genre into the immersive VR by using HMD through the update since 2016. The "Facebook spaces" as the VR service of Facebook and the "Sansar" of Linden Lab would be also produced as immersive contents and then scheduled to be released in the second-half of 2018.

When all the VR contents including Social VR are integrated in the immersive VR, however, there have been almost no research cases showing the higher effects of immersive VR on the communication than the non-immersive VR. Therefore, this study aims to verify if the Social VR flow developing into the immersive VR would be the technical application helpful for the formation of new journalism, by comparing the media effects between the immersive VR state wearing HMD and the non-immersive state without HMD.

• **Hypothesis 3. When consuming news contents in VR, the influence of other users' opinions on the attitude toward articles and public opinion would be bigger in case when wearing the HMD device (The matter of wearing the HMD device would have the moderating effects.) (figure 1).**

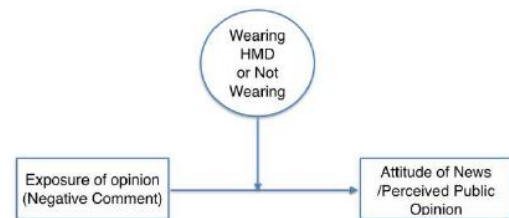


Figure 1. Research Model

### III. METHODS

#### 3.1. Procedure of Experiment

The experiment was conducted targeting 40 ordinary people in Seoul. The average age of subjects was 30.05 year old (SD=2.19), including 14 men and 26 women. The two-factor design in accordance with the matter of chatting and the matter of wearing HMD was applied to the experiment. The experiment was based on the random allocation of four conditions such as the condition wearing HMD without chatting window (N=10), the condition wearing HMD with chatting window for other users against the article (N=10), the condition without HMD and chatting window (N=10), and the condition without HMD and with chatting window for other users against the article (N=10).

When selecting the article issue, the issue showing the equal distribution of arguments for and against should be used, so that the effects of shared messages would not be changed by the subjects' predisposing attitude. For this, a preliminary research was conducted targeting 15 people.

Concretely, after suggesting total ten issues such as the abolition of autonomous private high schools, euthanasia, death penalty, and animal testing, and also giving opinion statements (example: I think that the autonomous private high schools should be abolished) of each issue, they were asked to respond to the degree of agreement on them in the ten-point scale (1=I absolutely do not think so, 10=I really think so.). Out of them, the issue of autonomous private high schools showed the most even distribution of arguments for and against. The issue with the mean of opinions that did not significantly get out of the median value (5 point) of scale was selected for the experiment (M = 5.39, SD = 2.53).

In the actual experiment, the article text was equally suggested to the experimental group and control group, under the title "The autonomous private high schools, facing the crossroads of maintenance and abolition" after modifying the article that was actually reported. The article was modified and produced to show the neutral tone of argument about the issue of the cancellation of designation of autonomous private high schools. The article was only suggested to the control group while the experimental group was presented with the article and the negative opinions in the chatting window. As the subjects' existing perception of the press could have effects on the dependent variables, to control this, the press name and the reporter's email address were deleted from the article.





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Before starting the experiment, the brief introduction of the experiment("A Study on the News Use in Virtual Reality") and the written consent of participation in the experiment were suggested. Following the guide's explanation, the subjects accessed the designated VR program(Second life Viewer) for the experiment. As soon as the experiment started, the experimental messages for each allocated condition were presented to the subjects.<Figure 2> is a screen shot of experiment



Figure 2. Experiment Screen

The article was only presented to the control group while the experimental group was presented with the article and also 12 cases of chatting comments written by four other users against the argument tone of the article. The suggested chatting was the contents against the cancellation of designation of autonomous private high schools, filled with the contents criticizing the issue. Some of the chatting used for the experiment are like <figure 3>.



Figure 3. Chatting Window Screen

After reading all the article and chatting, the subjects filled out the questionnaire. The questionnaire included subject's opinion about the suggested issue, the public opinion perceived by the subject(opinion of residents and general public), evaluation of the article and chatting, the influence of article perceived by subject, and the demographic information.

### 3.2. Measurement

For the measurement of subjects' opinion about the issue of experiment, they were asked like "How much do you agree on

the argument that 'the autonomous private high schools should be abolished?', and then they responded(1=I don't agree at all. 7=I agree very much.). Regarding the same issue, the public opinion perceived by respondents was asked by dividing it into residents' opinion and general public opinion. For the measurement of the perceived media influence, they were asked to respond to "How much do you think this article would have effects on the residents' attitude toward the cancellation of designation of autonomous private high schools?/ How much do you think it would have effects on the social opinion?"(1=No effects at all, 7=Huge effects), and the mean of those two questions was used.

Above this, the subjects' demographic information such as age and sex was verified.

## IV. METHODS

### 4.1. Verification of Homogeneity and Operationalization between Experimental Group and Control Group

Before verifying the hypotheses, it was verified if the homogeneity between experimental group and control group was secured, and if the experimental stimulus was fully operated. In the results of Chi-test, there were no differences in the distribution of sex ratio between experimental group and control group. Also, in terms of the perception of users' chatting, there were no differences between groups. Similarly, there were no significant differences in the impression of chatting with residents between groups( $p=.37$ ), so that it was verified that the chatting used for the experiment did not cause changes in the overall perception of chatting.

The results above show that the homogeneity between experimental group and control group was secured through the random allocation.

In order to verify if the experimental treatment was performed as intended, the subjects were asked to mark on the seven-point scale from 'active opposition' to 'active agreement' regarding the argument tone of the article and chatting on the cancellation of designation of autonomous private high schools. Regarding the article, both experimental group( $M=3.93$ ,  $SD=1.39$ ) and control group( $M=4.07$ ,  $SD=1.71$ ) were close to the median value(4.0), so that they perceived it neutrally.

Also, the argument tone of chatting comments in the experimental group showed the perception against the designation of autonomous private high schools( $M=2.07$ ,  $SD=1.03$ ). Therefore, the experimental treatment for the argument tone of the article and chatting was performed as intended.

### 4.2. Results of Verifying the Research Questions and Hypotheses

With the use of one-way ANOVA, it was verified if there were differences in the evaluation of the article itself between experimental group and control group, and if the influence on the public opinion was differently perceived. In the results of analysis,



compared to the control group, the experimental group showed more opposition to the cancellation of designation of autonomous private high schools, and the influence on the public opinion was also differently perceived.

Just as predicted by the <Research Hypothesis1>, the chatting with residents had effects on the evaluation of the article(p<.05). Compared to the control group, the subjects in the experimental group negatively evaluated the article(Experimental group: M=3.0, Subjects: M=4.0). In other words, when showing the position against the article through the chatting with other residents, there would be effects on the opinion about the article issue.

The <Research Hypothesis2> predicted that the experimental group would evaluate the influence of the article on the public opinion as lower compared to the control group. In the results of ANOVA, it was statistically significant, so that the experimental group evaluated the influence of the article on the public opinion as lower than

the control group(P=009). In other words, the article consumers exposed to the residents' opposing chatting showed the differences in the public opinion of the article. The mean(3.4) of perception of public opinion in the experimental group was lower than the mean(4.15) of perception of public opinion in the control group, so that the hypothesis was supported.

In the <Research Hypothesis3>, through the hierarchical regression analysis, it was analyzed if the matter of wearing HMD would moderate the effects of the exposure to other users' opposing opinions on the attitude toward the article[12]. In the results, just like <Table 1>, the hierarchical model 1, 2, 3 largely showed the changes in F value of significance probability. The interaction between the matter of wearing HMD and the matter of exposing to chatting having effects on the attitude toward the article was not statistically significant(P<.1) while there were no mediating effects.

Table 1: Results of Hierarchical Regression Analysis for the Analysis of Moderating Effects

Model						Change Statistics					
	R	R Square	Adjusted Square	R	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. Change	F
1	.488a	.238	.196		.94281	.238	5.625	1	18	.029	
2	.526b	.276	.191		.94558	.038	.895	1	17	.357	
3	.526c	.276	.140		.97468	.000	.000	1	16	1.000	

a. Predictors: (Constant), Exposure of chatting or Not

b. Predictors: (Constant), Exposure of chatting or Not, HMD or Not

c. Predictors: (Constant), Exposure of chatting or Not, HMD or Not, Exposure of chatting or Not\*HMD or Not

## V. DISCUSSION

In the aspect of effects(audience effect; [13]) caused by other media consumers' responses, this study verified if the evaluation of an article would be changed when reading other users' opinions against the article in VR, and also verified if wearing HMD would have moderating effects on the effects of other users' opinions on the evaluation of the article.

Just as predicted, in case when being exposed to the opinions against the contents of the article, the news consumers had more negative perception of the article. Also, the news consumers receiving other users' opposing opinions in VR, tended to infer the overall users' opinions and even the whole public opinion of society based on it. Such results support the hypothesis of the existing research arguing that people use other users' opinions as a clue for presuming the trend of public opinion about the relevant issue. However, the matter of wearing HMD did not mediate the effects of other users' opinions on the attitude toward the article in VR. It means that the increase of immersion is not certainly led to the increase of acceptance of others' opinions.

The implications of this study are as follows. First, to the media consumers, the possibility of chance in the media use pattern could be suggested. With the media consumption through VR, it would be possible to have the immediate and in-depth discussion of articles(Co-thinking media consumption). Compared to the irresponsible and decontextualized comments on internet due to the

anonymity, the dialogue in VR could have more serious communication. As it is also possible to have free communication in the virtual world rather than the reality, more in-depth discussions of article issues could be done. Also, receiving articles with the solid effect of the first-person in the VR device environment, the immersion in articles could be increased. Moreover, owing to the effects of individual opinion, it exercises the opinion influence to articles and issues. As this opinion has effects on the consumers, the individual journalism would be formed. As a result, the highly-influential power opinion leaders could appear.

To the press, the possibility of creating new business models through the two-way communication of news could be suggested. Through the hosts of discussion, composition of programs, and advertisement through discussion, the new revenue source could be created. Also, based on the diverse technologies of VR, various articles like 3D/high-definition image could be realized, and through the feedback system, diverse programs, platforms, and participatory contents could be developed.

Lastly, to the policy makers and marketers, the opinions of VR could be used as a barometer for understanding the opinions of consumers and people. As the opinions about articles could be directly utilized, the trend of public opinion and the response to products could be immediately understood. Therefore, it is possible to be used as a



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window for accepting opinions before establishing policies or before releasing products.

## REFERENCES

1. Gunther, A. C., & Christen, C. T. (2002). Projection or persuasive press? Contrary effects of personal opinion and perceived news coverage on estimates of public opinion. *Journal of Communication*, 52(1), 177~195.
2. Gunther, A. C., Bolt, D., Borzekowski, D. L. G., Liebhart, J. L., & James Price Dillard. (2006). Presumed influence on peer norms: How mass media indirectly affect adolescent smoking. *Journal of Communication*, 56(1), 52~68.
3. Gunther, A. C., & Storey, J. D. (2003). The influence of presumed influence. *Journal of Communication*, 53(2), 199~215.
4. Brown, C. E., Brown, D., & Ramos, J. (1981). Effects of a laughing versus a nonlaughing model on humor responses in college students. *Psychological Reports*, 48, 35~40
5. Bryant, J., & Miron, D. (2002). Entertainment as media effect. In J. Bryant & D. Zillmann (Eds.), *Media effects: Advances in theory and research* (2nd Eds., pp. 549~582). Mahwah, NJ: Erlbaum. Chapman, A. J. (1973). Social facilitation of laughter in children. *Journal of Experimental Social Psychology*, 9, 528~541.
6. Knobloch-Westerwick, N. Sharma, D. L. Hansen, and S. Alter (2005), "Impact of Popularity Indications on Readers' Selective Exposure to Online News", *Journal of Broadcasting & Electronic Media*, 49(3), 296~313.
7. Lee, Je-Sin, Seong, Min-Jeong (2007). The Effects of Reading Replies on the Perception of Online News Articles: Focusing on the PR Perspective. *The Korean Journal of Advertising and Public Relations*, 9(4), 7~45.
8. Ben. Greinera, Mary. Caravellab, Alvin E. Rothc (2014), Is avatar-to-avatar communication as effective as face-to-face communication? An Ultimatum Game experiment in First and Second Life *Journal of Economic Behavior & Organization*, 108(11), 374~382.
9. Gunther, A. C., & Christen, C. T. (1999). Effects of news slant and base rate information on perceived public opinion. *Journalism & Mass Communication Quarterly*, 76(2), 277~292.
10. Jeong, Il-Kwon, Kim, Yeong-Seok (2006), Impact of "Datgeul" of Online Media on Public Opinion : An Examination of Perception of Public Opinion and Third Person Effect, *Korean Journal of Journalism & Communication Studies*, 50(4), 302~327.
11. Bricken, M (1991), Virtual Reality Learning Environments: Potentials and Challenges. *Computer Graphics* 25(3), 178~184.
12. Baron & Kenny (1986), The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations, *Journal of Personality and Social Psychology*, 51(6), 1173~1182.
13. Bryant, J., & Miron, D. (2002). Entertainment as media effect. In J. Bryant & D. Zillmann (Eds.), *Media effects: Advances in theory and research* (2nd Eds., pp. 549~582). Mahwah, NJ: Erlbaum. Chapman, A. J. (1973). Social facilitation of laughter in children. *Journal of Experimental Social Psychology*, 9, 528~541.