

Information Transmission and Visual Image System Construction on WeChat Public Accounts of Colleges and Universities -- A Case Study on Jiangsu University

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Abstract: Objectives: This study aims to make the public platforms of modern colleges and universities more propagating and more accommodating to the use demand and psychological needs of the public. With the WeChat public account of Jiangsu University as an example, this study is based on the Customer Satisfaction Index (CSI) and combines the characteristics of the official WeChat public account of Jiangsu University. A Jiangsu University official WeChat public account customer satisfaction model was built according to the user evaluation of the usefulness, usability, enjoyment, appearance, and perceived information quality of WeChat public accounts. Methods: Focusing on vision and the readings of WeChat tweets from the Jiangsu University public account, we conducted two-factor analysis of variance to observe the participation behaviors of users. Thereby, the concrete strategies for Jiangsu University to build its vision system on its WeChat public account were systematically analyzed.

1. Introduction

The emergence and development of WeChat public platforms have altered the current information transmission and acquisition patterns to some extent. At the same time, it has also had a profound impact on people's cognitive activities and social behaviors. Colleges and universities, as mainstream institutions, have gradually settled into WeChat public platforms and achieved comprehensive functions, including information release, serving teachers and students, thought propaganda, and cultural talent cultivation. The WeChat public accounts from colleges and universities have huge and stable user groups, including university students, departments, and faculty members (professors and employees), former students, supporting members, employees, and managers of public and private organizations might be considered stakeholders, and high propagation arrival rate and efficiency. WeChat public accounts services have the peculiarity of benefiting multiple stakeholders. Despite the context of higher education being distinctive and presenting singularities, their influence during practical propagation and operation shall be further improved, and analysis models developed specially for this field are scarce ^[4].

The public knows a college or university no longer just from objective news reports or offline interviews but is influenced by social media. In addition to teachers and students on campus, an increasing number of off-campus users get to know a college or university through social media. People are offered unprecedentedly convenient

access to reading and socializing regardless of their levels of education, income, or occupation ^[3]. Social media has become one of the main channels through which information is distributed, and it can provide real-time information to the public in a cost-effective manner ^[5]. Thus, colleges and universities have to maintain good social images and reputation through social media, and actively use social networks to build and popularize their unique visual images.

While previous research on university or institutional branding has studied these elements separately via cognitive (e.g., service or educational quality attributes.) In this study focusing on the official WeChat public account of Jiangsu University, we analyzed its visual image. Jiangsu University is the organization that is the object of the study. Founded in 1902, it is characterized as a public state university located in Zhenjiang City, Jiangsu Province. Jiangsu University has around 36 thousand students enrolled in graduation and post-graduation courses in the areas of Human Sciences, Mechanical design, Life and Environmental Sciences, medical laboratory technology, vehicle engineering, pharmacy, and product design. In the last few years, Jiangsu University has engaged in annual publicity campaigns for student enrollment. The campaigns cover the whole China, with an emphasis on electronic media (Wechat public account, Microblog, TikTok, and the institutional website on the internet), due to the budgetary and financial restrictions experienced by the university. The campaigns generally use students from the university itself, as well as the participation of professors.

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The qualitative stage aimed to validate brand positioning and personal values scales, besides expanding and improving the understanding of the studied topics. In this stage, questionnaire survey was carried out with professors and students from Jiangsu University: 185 students, and 5 professors. The respondents were questioned about cognitive and affective attributes of Jiangsu University and the results contributed to the construction of the quantitative instrument. The second phase is characterized as A two-factor analysis of variance (ANOVA). Data were collected through readings of WeChat tweets on the official account. For the analysis of the collected data, the IBM SPSS Statistics version 21 software was used. Moreover, the participation behaviors of users were investigated. Finally, concrete strategies for Jiangsu University to build its vision system on its WeChat official account were systematically analyzed.

2.Design method and application based on theory of CSI model

2.1.Theory of CSI model

CSI is the abbreviation for Customer Satisfaction index. The Chinese customer satisfaction index (CCSI) model (Fig.1), which is based on the CSI model, adds brand image variables, replaces customer expectations with expected quality, and adds the influence of perceived quality on perceived value and customer satisfaction. For the official WeChat public number service, user satisfaction is the value of the degree of agreement between the user's perceived satisfaction with the actual content etc. provided by the public number and the content expected to be provided by the public number, and the degree of perceived effect of the user's acceptance of the service compared with its expected value.

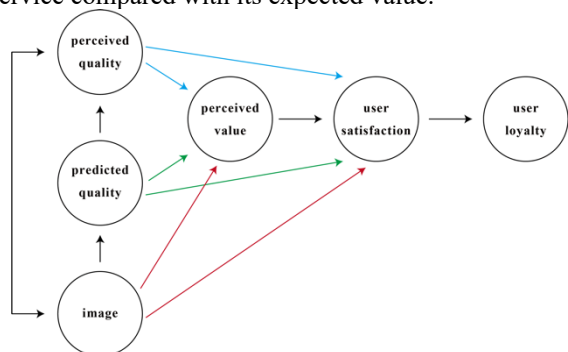


Fig. 1. CCSI model

2.2.Willingness to Use Jiangsu University WeChat official account

In the existing studies on the images of colleges and universities, there is little data analysis from the aspects of research methods or contents and even less analysis of user participation. In more studies, WeChat public accounts are used as information transfer tools, rather than a key step of vision system construction in colleges and universities. Thus, this study was targeted at the use of the WeChat public account by teachers and students at Jiangsu

University. The concrete directions of issues were determined using CCSI, and the influence relations between the demand hierarchy of users and the product functions were analyzed. User satisfaction was investigated according to the usefulness, usability, enjoyment, interface, and perceived information quality of users during the use of the WeChat public account.

Totally 200 valid copies of a questionnaire were returned, and then reliability was analyzed. Then the coefficient of Cronbach reliability was determined to be 0.984, which proved the samples were valid. Finally, the data from the questionnaire were analyzed.

1) The perceived usefulness positively affects the intention to use of users, and usability affects such intention at first, but this effect will disappear with time when experience is accumulated.

2) The willingness of users to use the public account is positively affected by the perceived enjoyment.

3) As for the appearance, the majority of users hold different views. Some users think tweet typesetting, and icons in the official account all shall be modified, and other users think the uniformity of the overall design can be improved.

The investigation also shows that perceived ease of use does not positively affect the perceived usefulness, but the perceived usefulness positively affects the perceived ease of use. The opposite direction of the association may be attributed to the oppression due to statistical errors. The perceived enjoyment, perceived ease of use, and perceived usefulness all affect the perceived information quality and thereby significantly and positively affect the willingness to use. Thus, after the Cronbach coefficient was determined, a check of data suitability for the factor analysis was performed to judge whether the factor analysis was justified for the set assertions [1]. The calculations showed that both stated parameters were within the prescribed limits, so the data were suitable for further research activities. We empirically analyzed the readings of the WeChat tweets on this official account in the last two years.

3.Empirical analysis

3.1.Interactive two-factor ANOVA and data declaration

ANOVA and regression analysis are two major statistical methods. ANOVA can reveal whether different factors affect the results differently. Regression analysis, including the commonly-used linear regression models, is a model that uncovers the relationship between independent variables and the dependent variable. The two-factor ANOVA was used to explore the effects of tweet themes and tweet typesetting on tweet readings at the official WeChat account of Jiangsu University, after which the obtained results were accounted for by using the SPSS statistic software. In addition to this technique, the basic indicators of descriptive statistics, as well as the key conclusions of the correlation analysis conducted among all of the pairs of the observed variables, are given [2].

(Brzaković et al. 2019) All data were available from the official WeChat account of Jiangsu University. Data about the readings of WeChat tweets on the official account of Jiangsu University between January 1st, 2021, and April 7th, 2023, were chosen, with a totally of 618 tweets. The independent variables were tweet theme and visual form, and the dependent variable was reading.

3.2.Independent variables

3.2.1. Tweet theme

The tweets released on the official WeChat public account of Jiangsu University were divided by the theme into 8 types: news bulletin, message notification, book recommendation, holiday tweet, creative themes, student recruitment and jobs, pandemic prevention, and history of the Communist Party of China (CPC). The tweet contents were coded in Table 1.

Table 1. Coding of tweets on the official WeChat account of Jiangsu University in accordance with contents

Category of tweet theme	Contents covered	Code
News bulletin	Campus news, great news, activity review, yearly report, etc.	1
Message notification	Interactive tweets, campus news, award notice, voting	2
Book recommendation	Book recommendation	3
Holiday tweets	Holiday greetings and knowledge pics/texts on holidays or solar terms	4
Creative themes	Titles and contents of tweets written according to the interests and focus of students	5
Recruitment and jobs	Recruitment of students, and employment on graduation	6
Pandemic prevention	Contents of pandemic prevention	7
History of CPC	Procession of CPC history	8

3.2.2. Visual forms of tweets

According to the visual display of tweets from the WeChat public account of Jiangsu University, the tweets were classified and coded into 6 categories: pure texts, SVG tweets (interactive articles), video tweets, pics/texts + videos, pure pics, and pics+texts. The visual forms of the tweets were coded in Table 2.

Table 2. Coding of visual forms of tweets on WeChat public account of Jiangsu University in accordance with contents

Visual form of tweets	Code
Pure texts	1
SVG	2
Videos	3
Pics / texts + videos	4
Pure pics	5
Pics + texts	6

3.3. Dependent variable

To clarify the effects of tweet themes, tweet visual forms, and their interaction on tweet readings, we chose tweet reading as the dependent variable and explored the effects of tweet themes and visual form on the reading effect.

3.4. Data analysis

3.4.1. Statistics

First, the tweet themes were statistically disassembled according to the visual forms of tweets. The readings of valid visual form under each theme were counted, and the results were shown in Table 3.

Table 3. Statistics

Code	Tweet theme	Valid cases	Classification of visual forms					
			Pure texts	SVG	Videos	Pics / texts + videos	Pure pics	Pics + texts
1	News bulletin	131	5	1	1	9	1	114
2	Message and notification	56	4	8	2	2	0	40
3	Book recommendation	13	0	0	0	0	0	13
4	Holiday tweets	25	0	3	2	6	3	11
5	Creative themes	177	1	8	4	9	4	151
6	Recruitment and jobs	97	9	3	2	8	0	75
7	Pandemic prevention	62	13	1	0	12	0	36
8	History of CPC	57	0	1	2	10	0	44
	Sum	618	32	25	13	56	8	484

As shown in Table 3, the types and number of visual forms that editors would choose in different types of tweet themes vary. It can be seen that Jiangsu University's official WeChat public number chooses the combination of graphics and text the most in terms of visual forms, which has the advantage of being adaptable to different themes and easy and quick to edit, but also tends to cause visual fatigue.

In order to investigate the effect of tweet theme and tweet visual format on the communication effect of tweets, this study used a two-way ANOVA (see Table 4) to test whether the two independent variables and their interaction had a significant effect on the dependent variable. The initial hypothesis was: The interaction of tweet topic and tweet visual format has a significant effect on tweet readership.

Table 4. Levene test of errors and variance under processing by tweet themes and visual forms

Levene test of errors and variance under processing by tweet themes and visual forms ^{a,b}					
Readings		Levene statistic	Degree of freedom	Degree of freedom	P
			1	2	
Readings	based on mean	1.844	45	570	.001
	based on median	1.229	45	570	.151

degree of freedom based on median and after adjustment	1.229	45	199.857	.171
based on mean after trimming	1.533	45	570	.016
a. Dependent variable: number of readings				
b. Design: Intercept + tweet theme + visual form + tweet theme * visual form				

3.4.2. Effect of tweet theme on the number of readings

To clarify the effects of tweet themes, tweet visual forms, and their interaction on tweet readings, we explored the effect of tweet themes on the readings via Duncan analysis while keeping the visual form unchanged. The results were listed in Table 5.

Table 5. Effect of tweet theme on the number of readings

Multiple comparison among different levels of tweet themes (Duncan's method)				
Duncan a,b,c				
Tweet theme	Number of cases	Subsets		
		1	2	3
4.00- holiday tweets	25	8667.0800		
8.00- history of CPC	57	9462.1228		
3.00- book recommendation	13		13862.8462	
1.00- news bulletin	131		16175.2824	
5.00- creative themes	177		16506.5254	
6.00- recruitment and jobs	97		17251.3918	17251.3918
2.00- message notification	56		17805.1250	17805.1250
7.00- pandemic prevention	62			21402.1452

As shown in Table 5, the tweet themes affect the number of readings to different extents.

3.4.3. Effect of tweet visual form on the number of readings

Moreover, the effect of tweet visual form on the number of readings was tested while the tweet theme was unchanged. The results were shown in Table 6.

Table 6. Effect of tweet visual form on number of readings

Tweet visual form	Number of cases	Subsets	
		1	2
3.00- videos	24	11703.3333	
1.00- pure texts	42	14802.4524	14802.4524
5.00- pure pics	33	15176.1818	15176.1818
6.00- pics + texts	356	16044.3146	16044.3146
4.00- pics/texts + videos	96		17214.0312
2.00- SVG	67		18008.0149

3.4.4. Two-factor ANOVA -- interaction between factors

Suppose factor A is tweet theme, and factor B is tweet visual form. ANOVA was conducted according to the principle of two-factor ANOVA. The results were listed in Table 7. At the significance level $\alpha=0.05$, factor A was found significant ($P<0.05$). In other words, the number of readings is mainly affected by the tweet theme, but not by the tweet visual form.

Table 7. Two-factor ANOVA of interactive factors

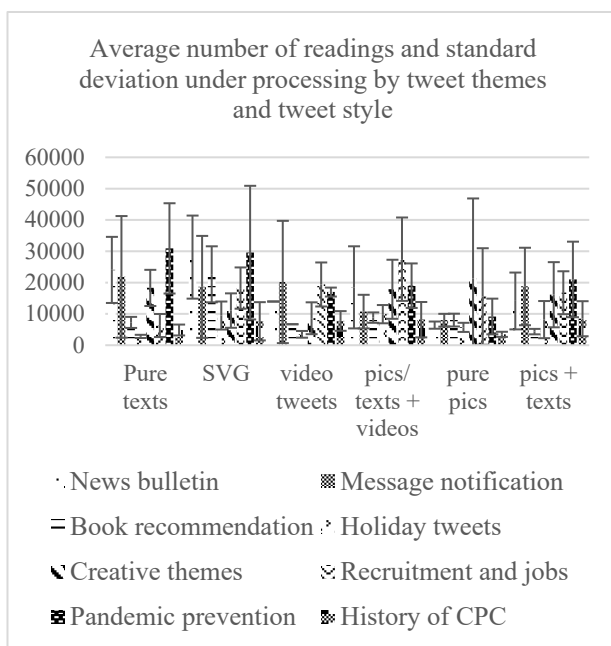
Between-subject effect test					
Dependent variable: number of readings					
Source	SS	df	MS	F	P
Tweet theme	272517811 4.137	7	38931115 9.162	3.867	.000
Tweet visual form	105457254 4.432	5	21091450 8.886	2.095	.064
Tweet theme x tweet visual form	544559560 9.558	35	15558844 5.987	1.546	.025
Error	573813294 02.242	570	10066899 8.951		
Sum after modification	697792058 99.076	617			
a. $R^2 = .178$ (adjusted $R^2 = .110$)					

The results of $F=1.546$ and $P=0.025 < 0.05$ prove that the null hypothesis is true (Table 7), indicating the interaction between tweet theme and tweet visual form significantly affects the number of readings. The interaction between various tweet visual forms and tweet themes affects the number of readings, indicating the tweet visual forms differ among the tweet themes.

3.5. Results and analysis

The interaction between tweet visual forms and tweet themes significantly affects the number of tweet readings. Together with the descriptive statistics in Table 8, it is known that the visual forms affect the number of readings in the order of $SVG > pics + texts > pics/texts + video > pure texts > pure pics > videos$. As for the effect of tweet themes on readings, news notices were read the most, followed by pandemic prevention and creative themes, but the history of CPC, book recommendations, and holiday tweets were read the least. Thus, it is urgent to improve the visual forms and modify the contents of these two types of themes.

Table 8. Mean number of readings and standard deviation under processing by tweet themes and visual forms



4. Optimization strategy for official WeChat account of Jiangsu University

4.1. Visual satisfaction of official WeChat account of Jiangsu University

According to the satisfaction questionnaire and two-factor ANOVA, the visual image of tweets released on the WeChat public account of Jiangsu University was further analyzed. Moreover, style features and color features were explored, and the design factors included tone, graphs, font, typeset, and colors. Then targeted user satisfaction was investigated.

4.2. Data analysis

Totally 50 valid copies of the questionnaire were collected, the survey included both teachers and students. About 50% of the users were familiar with the WeChat public account of Jiangsu University. Those who followed and wanted to know Jiangsu University were also enrolled as users, and their opinions were valuable and thus were included as data.

1) As for colors, users preferred green, the representative color of Jiangsu University, and other vivid and clear colors such as purple. They thought these colors were characteristic of Jiangsu University and shall be commonly seen in the tweets.

2) As for the aesthetic appearance, there was inconsistency between pics and titles. During the interviews, some users thought they cannot understand the symbols contained in the pics or tweets.

3) Users were also unsatisfied with the unreasonable layout, because the pages of the tweets were distributed disharmoniously, meaning the services on the public account were not as visible as expected by the users. So,

while mainstream media are exploring multiple forms of communication combining traditional language and imagery, it should be noted that the core remains the customer experience that is guided by the visual [6].

4.3. Modified strategy

Based on the concerns discovered during the study, we give suggestions on the scientific operation of the official WeChat account of Jiangsu University. As for the propagated audience, users outside the campus shall also be radiated to enhance the influence of the public account. The propagated contents shall be focused on social responsibility, and propaganda on external behavior identification shall be increased. Some tweets related to cultural activities, public welfare activities, special activities and exhibition activities can be appropriately added, so as to improve the credibility and honor of universities and gain social understanding and support, therefore, the ways of propagation shall be focused on videos, SVG, and other innovative ways.

In terms of esthetic experience, social psychology holds that good appearance has a halo effect, so the WeChat public accounts of colleges and universities shall consider the attraction to appearance. The design of interface, interaction, guidance and icon on official accounts shall be focused on element selection, which will make the signifier and the signified of marks consistent. In terms of layout, attention shall be paid to the relevance of pics/texts, the comfort of back-and-forth ground, and reasonableness, which will improve the sensory pleasantness and acceptability of users.

Finally, the information quality of WeChat public accounts of colleges and universities shall be improved. Analysis of the questionnaire shows that the perceived information quality, as an intermediary factor, affects all other tested variables. Thus, during the design of WeChat

public accounts, colleges and universities shall pay attention to the authority of the released contents, which will make users feel trusted and thereby improve their willingness to use.

5. Conclusions

Empirical research proves the construction of visual image systems of colleges and universities is a continually progressive and improving process. Effective propagation of WeChat public accounts contributes to improving the visual image propagation of colleges and universities, meets the pluralized cultural demands of college students, and thereby improves the reputation and identity of visual images of colleges and universities.

The study presents limitation concerns the public of the research, which covered only students and staff, and not the other stakeholders reported in the literature. The population chosen for the study, limited to a portion of the stakeholders with direct contact with the institution, may have influenced the results found [4]. In the second place, the study mainly used the number of readings displayed on the public account and studied the interest and preferences of users, but did not acquire more details. It was unknown whether users read repeatedly, or initiatively logged onto the public account. Thus, historical news and the historical readings of tweets may most reflect users' interests. Second, only the last two years of data on the WeChat public account of Jiangsu University were utilized. As a future proposal, research with the other categories of stakeholders that have contact with the colleges and universities, and with a randomly-selected sample is suggested, with greater statistical significance and that allows for more sophisticated analysis.

The significant propagation effect of WeChat public accounts plays a critical role in shaping and disseminating the images of colleges and universities. Research on the transmission effect of WeChat public accounts is significant for studying the image shaping and propagation of colleges and universities. WeChat public accounts also offer a new mechanism and chance for colleges and universities to create visual image systems and are efficient carriers of thought guidance and cultural propaganda for colleges and universities.

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