

The influence of digital media art on graphic design under new media era

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Abstract:

With the continuous development of the new media era, digital media art is increasingly integrated into the graphic design industry and is reshaping the way of design. This research aims to explore the influence of digital media art on graphic design in the new media era, and to make suggestions for the sustainable development of graphic design in the new media era. The research methodology employed in this study is a mixed method that includes qualitative and quantitative data collection. Data were collected using convenient sampling and questionnaires from 272 college students majoring in graphic design and digital media art at Xi'an Academy of Fine Arts and a semi-structured interview of 12 workers and educators in the field of graphic design and digital media art. In this study, the researcher used descriptive statistical methods to analyze the data and used inferential statistical methods including Pearson correlation analysis and multiple regression analysis to test the hypotheses.

The findings of the descriptive analysis show that the majority of the interviewees are women, and most of them are freshmen, freshmen and sophomores, and they are more concerned about the fields of digital media art and graphic design. A series of results of this study show that the four dimensions of digital media art (characteristic value, benefit value, education value and culture value) have a significant impact on graphic design, new media art has a significant impact on graphic design and there are significant influences between digital media art and new media era.

Keywords: Digital media art, Graphic design, New media era

Introduction

In the rapid development of digital information, the progress of science and technology, the rapid development of the Internet, people's way of production, way of life, way of reading, information communication. Both have undergone revolutionary changes. When people's eyes turn from paper to screen, the passive, linear and one-way of acquiring information is broken. In screen reading under the digital media, information is decomposed, collected, produced, stored and played in the form of "digital". People selectively screen information, and we are both the receiver and publisher of information. The intervention of new media forms not only provides more ways and means of

information presentation for visual communication design, but also brings a visual, audible, perceptible, touchable and movable information world to people.

Moreover, the interaction with traditional media promotes the change of our design thinking and methods. There was a shift in thinking "away from the elusive cause and effect relationship and toward the correlation of things." (Viktor Mayer-Schönberger, 2012) Some artists and designers try to find creative inspiration, design methods and expression from the perspective of the field outside the discipline. perhaps as David Carson suggests, graphic design methods will increasingly come from other non-design fields. In such a big era background, the author deeply feels that we need to view and think about design issues from a more open, diversified, systematic and connected perspective. Diversified media forms also provide us with more diversified design stages.

Digitalization will be an important driving force and fundamental feature of the construction, operation and development of the new era. 'Being digital' is becoming a typical summary and expression of individual and social survival and development mode in the digital era (Negroponte, N, 2000). Digitalization, as a new technological means and characteristics of the times, is affecting all aspects of art theory and practice.

Research Objective

1. To explore the factors of digital media art effect to graphic design.
2. To explore the factors of new media era influence to graphic design.

Methodology

1. Population

The scope of questionnaire collection is aimed at students majoring in graphic design and digital media art currently studying at Xi'an Academy of Fine Arts. This article takes the total number of college students majoring in graphic design and digital media in Xi'an Academy of Fine Arts who are from Year 1 to Year 4 as the sample interval.

2. Sample

This article takes the total number of college students majoring in graphic design and digital media in Xi'an Academy of Fine Arts who are from Year 1 to Year 4 as the sample interval, and uses the Tara Yamane Method (Yamane, 1967) to calculate the sample size, where the round figure sample size is 248. However according to Israel (1992) suggests that adding 10 percent to the sample size to fulfill non-response respondents. Therefore, the sample size for this research will be 272.

Most qualitative studies use participant observation and in-depth interviews to obtain first-hand information, and this study uses in-depth interviews to collect qualitative data. As suggested by (Creswell & Poth, 2016), the sample size range for qualitative

research is 5-25. Therefore, this study collected the information of 12 respondents. They are school professional teachers, designers and owners of design companies.

3. Data collection

Questionnaires were administered by university teachers and investigators and organized and implemented in the classroom. Each respondent was asked to complete the questionnaire independently in class. The questionnaire was administered twice, the first as a test and the second as a formal questionnaire.

4. Data analysis

SPSS 26.0 statistical software were used to perform descriptive statistics, reliability analysis, validated factor analysis, validation analysis, Pearson correlation analysis.

Results

1. Correlation analysis

Table 1 Correlation analysis of characteristic value of digital media art and graphic design

		Technical	Virtuality	Sensitization	Interactivity	Immersion
				n		
Graphic design	P	.393**	.309**	.410**	.413**	.380**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	272	272	272	272	272

** Correlation is significant at the 0.01 level (2-tailed).

Pearson correlation analysis showed in table 1 that the correlation between the total score of graphic design and each factors score of characteristic of digital media art were statistically significant ($p < 0.01$). The correlation coefficient between the total score of graphic design and interactivity characteristic of digital media art was the largest ($r = 0.413$, $p < 0.01$), and the correlation coefficient between the total score of graphic design and virtuality characteristic of digital media art was the smallest ($r = 0.309$, $p < 0.01$).

Table 2 Correlation analysis of benefit, education and culture value of digital media art and graphic design

		Convenience	More tools	Easy to make corrections	Education	Culture
Graphic design	P	.383**	.363**	.362**	.423**	.428**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	272	272	272	272	272

** Correlation is significant at the 0.01 level (2-tailed).

Pearson correlation analysis showed in table 2 that the correlation between the total score of graphic design and factors in benefit value, education value and culture value of digital media art were statistically significant ($p < 0.01$). The correlation coefficient between the total score of graphic design and culture value of digital media art was the largest ($r = 0.428$, $p < 0.01$), and the correlation coefficient between the total score of graphic design and easy to make corrections of benefit value of digital media art was the smallest ($r = 0.362$, $p < 0.01$).

Table 3 Correlation analysis of characteristic value of digital media art and new media era

		Technical	Virtuality	Sensitization	Interactivity	Immersion
New media era	P	.443**	.378**	.311**	.437**	.374**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	272	272	272	272	272

**. Correlation is significant at the 0.01 level (2-tailed).

Pearson correlation analysis showed in table 4,17 that the correlation between the total score of new media era and each factors score of characteristic of digital media art were statistically significant ($p < 0.01$). The correlation coefficient between the total score of graphic design and technical characteristic of digital media art was the largest ($r = 0.443$, $p < 0.01$), and the correlation coefficient between the total score of graphic design and sensitization characteristic of digital media art was the smallest ($r = 0.311$, $p < 0.01$).

Table 4 Correlation analysis of benefit, education and culture value of digital media art and new media era

		Convenience	More tools	Easy to make corrections	Education	Culture
New media era	P	.391**	.377**	.444**	.469**	.400**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	272	272	272	272	272

**. Correlation is significant at the 0.01 level (2-tailed).

Pearson correlation analysis showed in table 4.18 that the correlation between the total score of new media era and factors in benefit value, education value and culture value of digital media art were statistically significant ($p < 0.01$). The correlation coefficient between the total score of graphic design and education value of digital

media art was the largest ($r=0.469$, $p<0.01$), and the correlation coefficient between the total score of graphic design and provide more tools of benefit value of digital media art was the smallest ($r=0.377$, $p<0.01$).

Table 5 Correlation analysis of new media era and digital media art

		Efficiency	Accuracy	Diversity
P		.551**	.565**	.522**
Digital media art	Sig. (2-tailed)	.000	.000	.000
N		272	272	272

** . Correlation is significant at the 0.01 level (2-tailed).

Pearson correlation analysis showed in table 4.19 that the correlation between the total score of digital media art and factors in new media era were statistically significant ($p<0.01$). The correlation coefficient between the total score of digital media and accuracy of new media era was the largest ($r=0.565$, $p<0.01$), and the correlation coefficient between the total score of digital media art and diversity of new media era was the smallest ($r=0.522$, $p<0.01$).

Table 6 Correlation analysis of new media era and graphic design

		Efficiency	Accuracy	Diversity
P		.449**	.428**	.456**
Graphic design	Sig. (2-tailed)	.000	.000	.000
N		272	272	272

** . Correlation is significant at the 0.01 level (2-tailed).

Pearson correlation analysis showed in table 4.20 that the correlation between the total score of graphic design and factors in new media era were statistically significant ($p<0.01$). The correlation coefficient between the total score of graphic design and diversity of new media era was the largest ($r=0.469$, $p<0.01$), and the correlation coefficient between the total score of graphic design and accuracy of new media era was the smallest ($r=0.428$, $p<0.01$).

2. Pearson correlation

Table 7 Regression Coefficients of the four dimensions of digital media art characteristic and graphic design

		Coefficients			t	Sig.
Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std.Error	Beta		
1	(Constant)	.688	.232		2.879	.004
	Characteristic	.232	.060	.224	3.852	.000
	Benefit	.177	.059	.178	3.020	.003
	Education	.176	.058	.177	3.013	.003
	Culture	.202	.056	.205	3.569	.000

Dependent Variable: Graphic design (GD)

Regression equation:

$$GD = 0.688 + 0.232 * \text{Characteristic} + 0.177 * \text{Benefit} + 0.176 * \text{Education} + 0.202 * \text{Culture}.$$

As shown in table 7, the effect coefficient of the characteristic is $0.232 > 0$ and the significance $P = 0 < 0.05$ is shown in the coefficient table indicating that the characteristic of digital media art has significant impact on graphic design. With an impact value of $0.177 > 0$ and a significance level of $P = 0.003 < 0.05$, the benefit of digital media art has significant impact on graphic design. The effect coefficient of the education value is $0.176 > 0$ and the significance $P = 0.003 < 0.05$ is shown in the coefficient table indicating that the education value of digital media art has significant impact on graphic design. With an impact value of $0.202 > 0$ and a significance level of $P = 0 < 0.05$, the culture value of digital media art has significant impact on graphic design.

Table 8 Regression Coefficients of the four dimensions of digital media art characteristic and new media era

		Coefficients			t	Sig.
Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std.Error	Beta		
1	(Constant)	.528	.233		2.271	.024
	Characteristic	.224	.060	.210	3.697	.000
	Benefit	.232	.059	.227	3.947	.000
	Education	.237	.059	.233	4.508	.000
	Culture	.147	.057	.140	2.487	.014

Dependent Variable: New media era (NME)

Regression equation:

$$\text{NME} = 0.528 + 0.224 * \text{Characteristic} + 0.232 * \text{Benefit} + 0.237 * \text{Education} + 0.147 * \text{Culture}.$$

According to table 8, the effect coefficient of the characteristic is $0.224 > 0$ and the significance $P = 0 < 0.05$ is shown in the coefficient table indicating that the characteristic of digital media art has significant impact on new media era. With an impact value of $0.232 > 0$ and a significance level of $P = 0 < 0.05$, the benefit of digital media art has significant impact on new media era. The effect coefficient of the education value is $0.237 > 0$ and the significance $P = 0 < 0.05$ is shown in the coefficient table indicating that the education value of digital media art has significant impact on new media era. With an impact value of $0.147 > 0$ and a significance level of $P = 0 < 0.05$, the culture value of digital media art has significant impact on new media era.

Table 9 Regression Coefficients of the new media era and graphic design
Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		t	Sig.
		B	Std. Error	Beta			
1	(Constant)	1.811	.184			9.810	.000
	Efficiency	.168	.110	.467		1.527	.128
	Accuracy	.062	.109	.065		.567	.571
	Diversity	.223	.112	.240		1.988	.048

a. Dependent Variable: Graphic Design (GD)

Regression equation: $\text{GD} = 1.811 + 0.48 * \text{Diversity}$

According to table 4.26, the effect coefficient of efficiency is $0.168 > 0$ and the significance $P = 0.128 > 0.05$ is shown in the coefficient table indicating that efficiency is not significant impact on graphic design. The effect coefficient of accuracy is $0.062 > 0$ and the significance $P = 0.571 > 0.05$ is shown in the coefficient table indicating that the accuracy is not significant impact on graphic design. With an impact value of $0.048 > 0$ and a significance level of $P = 0.048 < 0.05$, the accuracy of new media era has significant impact on digital media art. Because diversity is also one of the factors in the new media era, after excluding efficiency and accuracy, H3 is established.

Table 10 Regression Coefficients of the new media era and digital media art

		Coefficients			t	Sig.
Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta		
1	(Constant)	1.895	.133		14.226	.000
	Efficiency	.171	.079	.241	2.158	.032
	Accuracy	.251	.079	.338	3.181	.002
	Diversity	.018	.081	.025	.221	.825

b. Dependent Variable: Digital Media Art (DMA)

Regression equation: $DMA = 1.895 + 0.171 \cdot \text{Efficiency} + 0.251 \cdot \text{Accuracy}$

According to table 4.28, the effect coefficient of the efficiency is $0.171 > 0$ and the significance $P = 0.032 < 0.05$ is shown in the coefficient table indicating that the efficient of new media era has impact on digital media. With an impact value of $0.251 > 0$ and a significance level of $P = 0.002 < 0.05$, the accuracy of new media era has significant impact on digital media art. The effect coefficient of the diversity is $0.18 > 0$ and the significance $P = 0.825 > 0.05$ is shown in the coefficient table means that the impact of diversity of new media era is not significant to digital media art. H4c is rejected.

In summary, all the hypotheses have been accepted as shown on Table 11.

Table 11 Hypotheses result

Hypothesis	Result
H1: Digital media art has a significant impact on graphic design.	Accepted
H1a: The technical characteristic value of digital media art has a significant impact on graphic design.	Accepted
H1b: The virtuality characteristic value of digital media art has a significant impact on graphic design.	Accepted
H1c: The sensitization characteristic value of digital media art has a significant impact on graphic design.	Accepted
H1d: The interactivity characteristic value of digital media art has a significant impact on graphic design.	Accepted
H1e: The immersion characteristic value of digital media art has a significant impact on graphic design.	Accepted
H1f: The benefit value of digital media art that can be more convenient has a significant impact on graphic design.	Accepted
H1g: The benefit value of digital media art that provides more tools has a significant impact on graphic design.	Accepted
H1h: The benefit value of digital media art that easy to make correction has a significant impact on graphic design.	Accepted
H1i: The education value of digital media art that develop more courses has a significant impact on graphic design.	Accepted
H1j: The social value of digital media art that environmental friendly has a significant impact on graphic design.	Accepted
H2: Digital media art has a significant impact on new media era.	Accepted
H2a: The technical characteristic value of digital media art has a significant impact on new media era.	Accepted
H2b: The virtuality characteristic value of digital media art has a significant impact on new media era.	Accepted
H2c: The sensitization characteristic value of digital media art has a significant impact on new media era.	Accepted
H2d: The interactivity characteristic value of digital media art has a significant impact on new media era.	Accepted
H2e: The immersion characteristic value of digital media art has a significant impact on new media era.	Accepted
H2f: The benefit value of digital media art that can be more convenient has a significant impact on new media era.	Accepted
H2g: The benefit value of digital media art that provides more tools has a significant impact on new media era.	Accepted

H2h: The benefit value of digital media art that easy to make correction has a significant impact on new media era.	Accepted
H2i: The education value of digital media art that develop more courses has a significant impact on new media era.	Accepted
H2j: The social value of digital media art that environmental friendly has a significant impact on new media era.	Accepted
H3: New media era has a significant impact on graphic design.	Accepted
H3a: The efficiency characteristic value of new media era has a significant impact on graphic design.	Rejected
H3b: The accuracy characteristic value of new media era has a significant impact on graphic design.	Rejected
H3c: The diversity characteristic value of new media era has a significant impact on graphic design.	Accepted
H4: New media era has a significant impact on digital media art.	Accepted
H4a: The efficiency characteristic value of new media era has a significant impact on digital media art.	Accepted
H4b: The accuracy characteristic value of new media era has a significant impact on digital media art.	Accepted
H4c: The diversity characteristic value of new media era has a significant impact on digital media art.	Rejected

Discussions and Conclusions

A total of 272 questionnaires were collected in Xi'an Academy of Fine arts. From the research data on demographic characteristics, it is found that most of the respondents are female (65.43%), they are mainly freshmen (27.57%) and sophomores (27.57%), and their majors are graphic design (72.06%). On the whole, the students in the school are mainly female, and the number of graphic majors and digital media majors recruited has increased in the past two years, and most of them are graphic design. The study also found that students at school pay high attention to graphic design (91.2%) and digital media art (88.2%).

The results of descriptive statistics show that the aspect that respondents least agree with the characteristics of digital media art is "technical" (Mean=3.31), and the aspect that respondents least agree with the benefits of digital media is "easy to correct" (Mean=3.29), among the impact of the characteristics of the new media era, the respondents least agree with the "diversity" of the new media era (Mean=3.30). It can be seen that these aspects are what digital media art and the new media era need to continue to improve. In addition, among the influences of digital media art and new media era on

graphic design, the most disagreement is "improving the humanistic care of graphic design" (Mean=3.30). It can be seen that there is still a need to find more ways to develop and strengthen graphic design.

Pearson correlation analysis showed that all variables and dimensions in this study were significantly positively correlated. In addition, regression analysis also found that the four dimensions of digital media art (characteristic value, benefit value, education value, culture value) have a significant positive impact on graphic design (sig. < 0.05), and the regression coefficients are 0.000 and 0.003 respectively, 0.003 and 0.000. The magnitude of influence is characteristic value, culture value, benefit value and culture value. Among them, the characteristics of digital media art have a positive impact on graphic design, which was consistent with the views of scholar Shi Xueqing (2013). The benefit value of digital media art has a positive impact on graphic design, which was consistent with the views of scholar Xueqing Shi (2013). The education value of digital media art has a positive impact on graphic design views which was consistent with the views of scholar Ying Liang (2022). The view that the culture value of digital media art has a positive impact on graphic design which was consistent with the views of scholars Yue Wang and Yin Li (2021).

The four dimensions of digital media art (characteristic value, benefit value, education value, culture value) have a significant positive impact on the new media era (sig. < 0.05), and the regression coefficients are 0.000, 0.000, 0.003, and 0.000, respectively. Among them, education value has the least influence. The characteristic value of digital media art has a positive impact on the view of the new media era which was consistent with the views of scholar Du Wen (2010). The benefit value of digital media art has a positive impact on the view of the new media era which was consistent with the views of scholar Wen Du (2010).

Diversity in the new media era has a significant positive impact on graphic design (sig. < 0.05), with a regression coefficient of 0.048, which was consistent with the views of scholar Yu Yaosong (2019). The convenience and accuracy of the new media era has a significant positive impact on digital media art (sig. < 0.05), with regression coefficients of 0.032 and 0.002, which was consistent with the views of scholar Gong Zheng (2021).

Recommendations

1. Strengthen legal publicity and media supervision, and raise copyright awareness.

National legal departments and related media should increase the propaganda of copyright law, help Internet users establish correct copyright awareness, guide users to consciously abide by morality and related laws, and consciously respect original works. At the same time, media at all levels should also strengthen the supervision of users,

strengthen the gatekeeper mechanism, review the works created and forwarded by users, delete pirated works in a timely manner, and minimize the adverse effects caused by the circulation of pirated works.

2. Take the audience as the center, create and disseminate works of art that the audience loves to see.

Media operators should accurately locate the audience, meet their needs with the audience as the center, disseminate art information that the audience loves to hear and see in a civilian language and in a down-to-earth manner, and disseminate truly warm and meaningful art information with an affectionate attitude. A work of art that is warm and appealing to both refined and popular tastes.

3. Improve the media literacy of communicators and enhance the seriousness of art communication.

In the new media environment, everyone is a communicator. Professional media should strengthen team building and training, promote the accumulation of knowledge and improve the skill level of practitioners, accelerate the update and transformation of their technology and thinking, and comprehensively improve the overall quality of the media team. Quality. At the same time, the media and schools should actively assume the responsibility of improving the media literacy of ordinary audiences, actively offer relevant courses, and improve the audience's awareness of media literacy-related knowledge

4. Increase capital and technology investment and strive to narrow the digital divide.

Media publicity and media education in underdeveloped areas should be increased, media talent training, team building, and network computer knowledge system construction should be increased to promote the reform and reorganization of media organizations and improve work efficiency, thereby improving the audience's ability to use media to obtain information. The rights and interests of the media at all levels, and strive to narrow the digital divide caused by differences in media development and uneven information.

5. Enhancing emotional expression in graphic design.

The most vital aspect of advertising would be to bring the audience in a soulful experience and resonate with the audience. This should be the most direct feeling that the advertisement can bring to the audience. Among them, it should also have the characteristics of a wide range of dissemination, so that the advertising information can be disseminated more widely, so that more people can understand it. For graphic design itself, it is necessary to rely on the media to disseminate its own information.

6. The path to realize the concept of green design in graphic design.

Graphic design has a certain degree of systematization, including not only the embodiment of design content, but also the use of materials, craft production, etc. Therefore, the green design concept must be integrated into all aspects of graphic design, so as to truly reflect the advantages of the green design concept.

Recommendations for Further Research

In future research, other variables or intermediary variables and other possible influencing factors or related factors can be incorporated into the framework, such as customer needs and other factors, and further verified to improve the research framework system. Also, this work does not perform a comparative study on demographic variables and the handling of the new media era, digital media art, and graphic design by different age groups, which might be studied further in future research. In the future, we should continue to explore other influencing factors to provide useful information, reference and guidance for the development direction of graphic design in the new media era.

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