Influences of AI Graphic Design on Environmental Communication for Climate Change

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Abstract: In human dimension, environmental communication plays a crucial role in fostering public engagement in climate problems. This research studied the potential of AI graphic design (AIGD) to efficiency in environmental communication. Questionnaire surveys and participant observation with task-based methods were used for primary data, supplemented by documentary analysis on the research articles contributed to environmental issues from interdisciplinary approaches for climate communication. An accidental-selective sampling was applied for 402 students at Huangshan University as the representatives of Chinese youth sharing the idea towards the significance of environmental communication and the related AI visual effects. A task-based method on AIGD, with the evaluation criteria of normative, innovative, aesthetic, and effect for environmental communication was arranged for the students attending the AIGD course during the school year 2024. This method offered insights into the practical application of AIGD for environmental communication in a real-world setting. Prominent findings are that the environmental communication research have been increasing with more realizing the how-to of information dissemination and environmental education, Chinese youth tend to positively react with visual communication in environmental issues, and that AIGD has a positive impact on environmental communication. AIGD has a strong correlation to environmental communication pertinent to the dimensions of verify, inform, educate, and warning as a so-called VIEW model. The inform dimension represents the strongest relationship with every AIGD evaluation criterion. The core elements of environmental communication are the scientific and authenticity of climate information while the comprehensibility and memorability of information need to be optimized. AI visual communication has achieved some results in case of not over - rely on AI. To maximize environmental communication, it is essential to prioritize clear and educational content while also considering visual appeal. The youth's enthusiasm and creativity in environmental protection and actionable engagement in climate change must be mobilized in continuity.

Keywords: AI graphic design, environmental communication, VIEW model

1. Introduction

Climate change has a profound impact on the earth system and increases the risk of extreme weather events. Over the past few decades, climate change was the subject of sustained and extensive research in the natural sciences focusing on the causes and effects, exploring greenhouse gases emission, monitoring and predicting the degree of climate change in a specific region on a specific time scale. The results have been furthered to enhance the factual understanding of the natural phenomenon and provide scientific options for mitigation and adaptation. Through its impact on natural systems, climate change has also multiple adverse effects on social systems, directly and indirectly. Particularly, climate crisis is not a pure natural science issue but an interdisciplinary problem requiring full consultation by multiple entities. Even though people acknowledge the reality of climate change, actual action was limited or non-existent (1). In short, the huge increase in climate crisis all over the world is mirroring the efficiency in environmental communication that is still low. Taking environmentally friedly performance not only affects progress toward sustainability but also represents as to how people view themselves, and how important changes are in individual behavior. Consequently, addressing climate change issues requires more effective communication strategies.

Environmental communication

As pragmatic and constructivism, environmental communication is an interdisciplinary field that becomes an important tool of environmental information transmission through media reports, debates, and decisions on environmental issues to drive public engagement and social change. For pragmatism, environmental communication involves with information encapsulation, transmission, reception and feedback. In terms of constructivism, it

characterizes political, cultural and philosophical propositions behind environmental issues through specific expressions (2). Environmental communication should concentrate more on behavior change rather than merely knowledge transfer, showing more significant progress towards the increasing complexity of environmental issues (3). Communication of climate science needs to be integrated into the psychological and social contexts of the public to increase the acceptability of information addressing global environmental challenges and the optimization path for environmental communication.

1. VIEW model.

In the digital age, communication tools are everywhere so everyone can transmit information across channels, at a fast and convenient pace. Since the 21st century, coupled with the role of digital media technologies, research on environmental communication has made significant progress in climate agenda. VIEW model is a method of environmental communication that requires journalists to make diligent efforts to confirm the accuracy and credibility of environmental news sources, while highlighting the newsworthiness surrounding the information before it is disseminated (4). In communication practice, ensuring accuracy, credibility, timeliness and updatability is the principle of information dissemination for reaching public understanding and action. In the new era, news can flow to the receivers at any time, through several channels, and by their own decision in which they keep interested, including sharing and comment distribution. Environmental disseminators must prioritize presenting facts that necessitate academic insights and guidance from either experts or individuals who have experienced real-life and environmental events firsthand. External factors of information environment can interfere with public perceptions of environmental issues while the ideology of communicator can affect the neutrality of media reports (5). Addressing climate change misinformation requires more effective communication strategies. With the increasing global environmental problems, environmental communication has gradually become a hot field of academic research that leads to the emergence of VIEW models comprising 4 dimensions of communication for environmental issues. They are V-verify, I-inform, E-educate, and W-warning.

The core of V-verify dimension is to ensure the accuracy, reliability, and comprehensiveness of environmental information. The verification of information for the correct transmission of scientific data is particularly important to environmental communication because the distortion of information can seriously affect public cognition and behavior. Credibility is an important factor in ensuring the effectiveness of environmental communication, especially in public perception and response to environmental issues. With the V-verify, the information disseminated must be truthful and grounded (6).

The I-inform dimension pays attention to timeliness, updatability and fact of information. The fact of information is one of the most basic requirements in reporting environmental news, covering the reliability and authority of information sources (7). New media has brought changes to environmental communication, and timely dissemination of information can enhance public awareness of environmental protection and the necessity of participation. Misinformation is harmful to weaken the public's attention to environmental issues. Timely updating of information is important to resist the spread of false information while updatability is essential to effectively cope with the rapidly changing environmental problems (8).

The dimension of E-educate emphasizes improving the public's understanding, comprehensibility and literacy of environmental issues. Understandable is the premise to ensure the effective transmission of information. The primary task covers producing informative content that can help the public understand environmental issues. E-educate element also fosters an individual's sense of responsibility and capacity for action towards the environment by providing knowledge and understanding of environmental issues. Included is to stimulate the willingness to engage in sustainable practices and broader environmental protection behaviors (9). Improving environmental literacy is not only about implanting environmental knowledge, but also about cultivating individuals' critical thinking and action abilities. Environmental literacy is the key to changing public behavior and supporting environmental sustainability.

The W-warning dimension focuses on how to promote public awareness of environmental risks and response actions through warning information. The alertness of environmental warning messages is fundamental to ensuring a timely public response in the event of a crisis. Raising public awareness of environmental risks is one of the goals of the warning message (10). The ultimate purpose of warning messages is to motivate the public to act, convey threats, and provide concrete action suggestions. In short, the warning dimension emphasizes the alertness, awareness raising and action guidance of environmental communication in emergency situations of crimate crisis.

2. Digital art media.

Environmental communication of new generations has significant digital characteristics, with the highlighted role of social media platforms to obtain real-time environmental information, form their own environmental views and do the interaction, especially in the form of visual communication (11). The characteristics of the new generation in information acquisition, value construction and social interaction determine their unique role in environmental concern. Visual data presentation makes complex environmental information easier to understand and disseminate, therefore, images on short videos, with great spreading power, can demonstrate the seriousness of environmental problems in an intuitive way and evoke an emotional response from the audience. Graphics and images play a crucial role in environmental communication as they can effectively convey complex scientific information to the public in an accessible and engaging manner. Visual digitized representations such as charts, graphs, and maps can simplify data and make it easier for people to understand the magnitude and impact of climate change. In the process of evolution, virtual art gradually dissipates the vividness and beauty of traditional art. It is increasingly inclined to develop interactively with the audience.

The characteristics of digital art media are hypertext, interactivity, virtual reality, and immersive experience. For hypertext, network technology not only brings a leap in speed, scale and form for human information transmission and sharing, but also creates a communication space and experience space appropriate for human and machine interaction. Interactivity has three meanings for digital media. For virtual space, computers can interact with users through input and output devices. For real space, a system of sensors, exciters and computers can detect and react to a person's position, touch and sound. For interactivity on information transmission, the terminal of the computer network has the function of receiving information and sending information at the same time so it can realize two-way communication. In terms of virtual reality, it appeals to human feelings, which is no different from reality. The difference is that virtual reality strives to make people feel as if they were there, perceiving mediated experiences as unmediated. Immersive art can either be antireality or participation, which is unlike traditional art media encourages participation rather than preventing it. As the product of the perfect combination of science and art, digital art media is not only open, instantaneous, interdisciplinary art, but also multimedia, process, discussion, concept and context-dependent art. It is the recombination of virtual images and the real world, which can deeply explore the potential aesthetic value of interactive and extended images (12).

AI graphic design (AIGD)

In traditional news production, images are primarily sourced from actual news scene shoots. As the content of the image is simple and direct, it can quickly capture viewer's attention. Due to the development of Internet technology, network bandwidth is gradually stronger, and dynamic graphics have replaced the dominant position of static pictures. Today, artificial intelligence (AI) has strong potential in daily lives by improving the efficiency and convenience of work and life. The intervention of AIGD where the graphics and images are generated and disseminated has become more intelligent and diversified those essential to the changes in the interactive way of environmental communication, content creation and efficiency in information dissemination. Different from a single traditional art type, AIGD is a form of digital art media where adopts advanced visual language and flexible use of various digital media by highly integrating the characteristics of artistic expression, digital technology and visual communication (13). AIGD has a vital role in visual communication for weather news reports. It provides innovative solutions for environmental communication by automating efficiency, creative and data-intensive visual contents. Coupled with IOT technologies, the basic evaluation criteria for AIGD includes the aspects of normative, innovative, aesthetic, and effect generated those equivalent to N, I, A, E, respectively (14).

N-normative refers to conformity of content. To comply with a normative criterion, AI-GD uses the type and positioning of the database, with consideration on needs of users, basic information, category, main function, and user positioning. Although such an approach makes the design suffer more restrictions, the potential benefits are obvious. The more accurate information design has, the more economic and ethical value is.

I-innovative is form and style inniated with AI technology for design. To some extent, creativity is the first element of graphic design. There is no good work if creativity is not generated. AI tools can better help designers analyze the current design trends and popular elements, grasp the market dynamics, and create design works in line with the trend.

A-aesthetic is the basic value of design determining its degree of formal beauty. The aspects of harmony, contrast, balance, rhythm, and pacing are criteria for aesthetic evaluation, including material, technical and symbolic elements which are also taken as the three important components. These elements are skillfully arranged, configured, and combined for completing a piece of work.

E-effects stand for visual communication effectiveness. Through the right combination and level, the AI-GD can deliver visual communication, achieving a richer and deeper visual effect by consideing the relationship and interaction based on 3 principles; combination, hierarchical design, and the division of information levels. Also, designers can highlight key elements and important information in design works by means of magnification, bold or contrast, to improve the audience's attention to specific content and memory effect.

2. Objectives and Variables

The importance of environmental communication and the potential of AIGD to environmental communication were set as the purposes of this research. The assumptions are that AIGD is influential to the efficiency in environmental communication for climate change, and the importances of VIEW model in environmental communication. The evaluation criteria of AIGD are NIAE; N-normative, I-innovative, A-aesthetic and E-effective while the dimensions of verify, inform, educate, and warning stand for each element in the VIEW model, respectively.

The reviewed literatures include environmental information dissemination, climate change, theories regarding environmental communication, digital art media, AIGD, and visual effects. A conceptual framework was drawn as Figure 1 showing the variables relationship between AIGD through NIAE and the environmental communication on the VIEW model. Finally, the inclusive outcome is the efficiency in environmental communication for climate change.
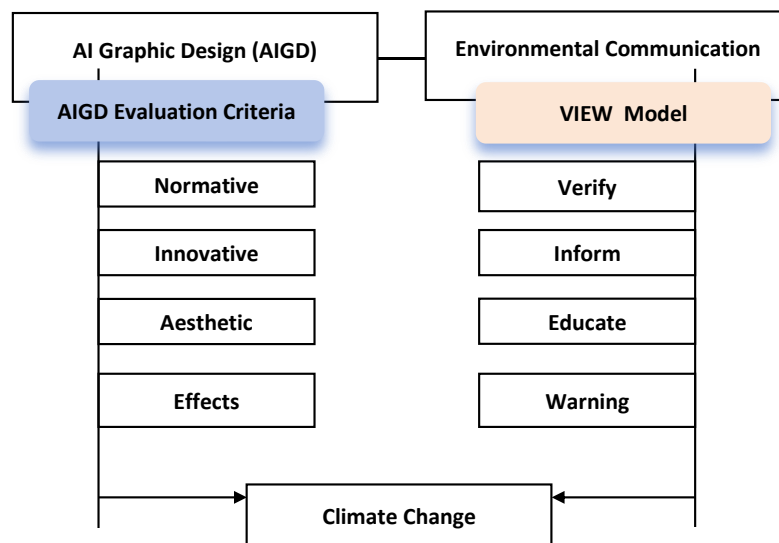

Figure 1. Conceptual framework for the variable's relationship between AIGD and environmental communication for climate change

3. Methodology

To meet the research objectives, the research methods include a documentary analysis, questionnaire survey, and participant observation with task-based approach. Target population are Chinese youth represented by the students at Huangshan University in Anhui Province, China.

Research method and population

1. Documentary research.

Google Scholar is an online database good for conducting simple searches across a broad number of scholarly articles. To address the significance of interdisciplinary approach for climate agenda, Google Scholar was used in

this research as a search engine by keywords and/or article titles of environmental communication, and those plus the implication of each dimension in VIEW model available during 2019-2024 in the form of electronic articles. Then sort out literature content and extract key insights applied for data analysis on the growing concern to environmental communication and the relation of each dimension in VIEW model.

2. Questionnaire survey.

To evaluate the understanding and awareness in environmental communication, and AI for visual effects, the research employed a questionnaire survey for the target population of Chinese youth who are the students at Huangshan University in Anhui Province. The reliability of questions on a 5-point scale was measured by 30 samples. Cronbach's alpha coefficient of the questionnaire was 0.961, which was much higher than the reliability standard of 0.7, indicating that the scale had high internal consistency. Based on the equity of sample size calculation with the confidence level of 95%, the number of 402 students were the real samples used for accidentally selective data collection via the Internet on the open program, namely Questionnaire Star. The questionnaire results provide data evaluations on a 5-point scale using the mean values to determine the level distribution starting the 5 scores for strongly agree to the 1 score for strongly disagree level. The statistics of frequency, percentage, mean, standard diviation (S.D.), and correlation coefficient were used for data analysis.

Data in Table 1 and Figure 1 indicate the background of the samples. The differences in gender and field of major study among the 402 students were deployed to reflect the real situation and representativeness of the samples for the youth population.

Table 1. Gender ratio compared between national census and the youth samples

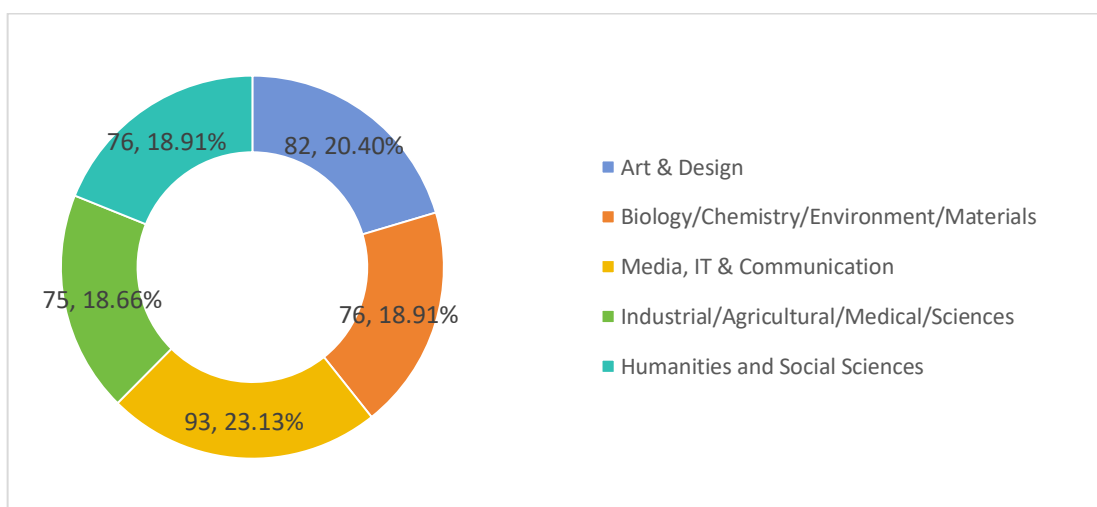| Gender	Frequency	402 samples (%)	Chinese national census (%)
Male	208	51.74	51.24
Female	194	48.26	48.76
Total	402	100	100

Figure 1. Distribution of major study of the samples

3. Participant observation with task based.

The method of participant observation was applied for 37 students learning the AIGD course in the school year 2024 at Huangshan University in Anhui Province, China. When the course ended, the task of AIGD works for environmental communication through the VIEW model on the theme of heatwave situation were appraised by the students themselves, individually and excluding their own work. In combination with the appraisal, the 5-point scale questions used for the earlier 402-questionnaire survey were applied for the 37-samples observation method, accordingly. The highest overall score of the student works was selected and sorted out in random order to represent the potential of AIGD in environmental communication. Finally, the attribute of this method includes evidence of learning outcomes regarding the youth's understanding and awareness in environmental issues.

4. Results and Discussion

Research on VIEW models in environmental communication

According to Table 2, it is evident that during 2019-2024, the research on environmental communication rises to 17,800 articles. The key insights of the articles are common to the increasing significance of environmental communication for climate agenda, with emphasis on environmental information (I-inform) and education (E-educate). Under the VIEW model, the implications of I-inform and E-educate in environmental communication eventually extend to the emphasis on environmental protection, environmentally friendly behavior, public awareness and participation in environmental problems and climate agenda. In addition, the I-inform is mostly contributed to the research in environmental communication (17,600 articles), followed by E-educate at 16,100 issues. W-warning accounts for 2,960 articles where the key insights involve a variety of solutions for a timely and effective warning system. The least is the V-verify at 1,760 ariticles indicating that the complexity and scientification of environmental information are associated with a pure natural science issue rather than an interdisciplinary problem. However, the importance of authentic and reliable data sources in climate communication was clearly addressed in the 2021 IPCC report.

Table 2. Electronic articles of environmental communication coupled with the element of VIEW model

Keyword	Google Scholar (articles)	Key insights (2019-2024)
Environmental communication	17,800	▪ Art and emotion in evoking environmental action ▪ Role of new media technology in environmental communication ▪ Interdisciplinary collaborations for environmental sustainability
V-verify in Environmental communication	1,760	▪ Demand for external verification of environmental information ▪ Adoption of AI and blockchain to the verification of environmental data. ▪ Verification of the ESG practices
I-inform in Environmental communication	17,600	▪ Environmental information dissemination and public perception ▪ New technology for environmental information communication. ▪ Evidence of environmental communication for climate change
E-educate in Environmental communication	16,100	▪ Environmental and sustainability education ▪ Interdisciplinary approach to climate change ▪ Innovation of educational tools and methods for climate communication ▪ Communication and deliberation for environmental governance
W-warning in Environmental communication	2,960	▪ Integration of multi-source data for effective warning on climate crisis ▪ Communication mechanism for environmental situation ▪ Construction of cross-regional and interdisciplinary early warning system ▪ Localization of policy coordination and communication practice in climate agenda ▪ Application of intelligent and platform-based communication technology for climate warning

Environmental communication and AI for visual design among Chinese youth

As in Table 3, the results show that the significances of environmental communication and AIGD in climate change are moderately perceived among the students equivalent to the total mean value at 3.38. The highest agreement

contributes to the significance of environmental communication in *driving environmentally friendly behaviour* (4.24) and *facilitating rapid understanding* (4.23), indicating that the students are most concerned about the relationship between environmental communication and visual effects, and believe in its positive impact on environmental behavior. The result is concurrent to the conclusion that Chinese new generation are increasingly aware of climate crisis, especially the healthy performances in low carbon life and green consumption (15)

Score regarding visual effects as in *environmental communication needs to have good visual effects* captures the least (2.58), indicating that the sample participants believe that the association between environmental communication and visual effects is weak. The score of information memory is also low (2.60), indicating that the samples have weak long-term memory of environmental information transmitted, and more innovative communication methods may be needed to enhance the memory. For young people, graphics and data not only provide a clear perspective, but also help them understand environmental issues from a more rational and systematic perspective, which in turn motivates them to take positive action (16).

In terms of the use of AIGD *helping raise awareness of environmental protection* has the highest standard deviation (0.954), indicating that the students have a large divergence of opinions on this issue. Some believe that AIGD can promote environmentally friendly behavior, while others may be skeptical about its value for the communication of environmental issues. AIGD also has the highest mean score of *encouraging environmental actions* (3.74), indicating that the application of AIGD in environmental communication can encourage most samples to take environmental actions. The score of *AIGD providing actual environmental knowledge* (3.47) is slightly lower, but it still shows that AIGD is applicable for improving environmental knowledge of the samples. However, AIGD has the lowest score in helping *promptly improve your environmental behavior* (2.88), indicating that to improve and prevent the youth's attitude from slipping is in priority. It is also pertinent to the conclusion discovered by Zhang (17) that the use of AI technology to generate personalized environmental information and image content can better connect with the interests and needs of young people to enhance their environmental awareness.

Table 3. Perception of environmental communication and AI for visual design among the Chinese youth

Questions	Degree of agreement (%)					Mean	S.D.	Level
Environmental communication	5	4	3	2	1			
1. Provide rich environmental information	11.19	30.35	46.02	11.44	1.00	3.39	0.868	Average
2. Scientifically verified in accuracy	11.19	34.08	42.78	10.70	1.25	3.40	0.872	Average
3. Information must be the fact	8.95	11.69	51.99	22.39	4.98	2.97	0.948	Average
4. Attract audience attention	7.71	46.77	33.83	10.45	1.24	3.49	0.830	High
5. Facilitate rapid understanding	45.27	33.83	19.90	0.75	0.25	4.23	0.808	Highest
6. Have good visual effects	4.23	9.45	37.56	37.81	10.95	2.58	0.952	Low
7. Easy to understand	13.18	34.08	44.78	6.72	1.24	3.51	0.851	High
8. Facilitate memory information	3.48	7.71	46.02	31.09	11.61	2.60	0.916	Low
9. Have warning information	11.19	34.82	42.80	9.95	1.24	3.45	0.864	High
10. Drive environmentally friendl behaviour	46.26	34.08	18.16	0.75	0.75	4.24	0.827	Highest
AI for Visual Design								
11. Provide practical environmental knowledge	12.68	34.58	40.80	10.69	1.25	3.47	0.891	High
12. Raise awareness of environmental protection	7.96	31.59	46.27	12.93	1.25	3.32	0.954	Average
13. Better understand climate crisis	12.69	33.08	41.54	10.94	1.75	3.44	0.909	HIgh
14. Encourage environmental action	45.52	33.33	19.65	1.00	0.50	3.74	0.829	High
15. Prompt to improve environmental behaviour	5.47	14.43	51.74	19.15	9.20	2.88	0.844	Average
Total						3.38	0.906	Average

Correlation of AIGD in VIEW model

The prior research results drawn in descriptive analysis and table presentation eventually addressed the importance of VIEW model and AIGD for environmental communication. To conclude their relationship, the correlation coefficient test was taken based on the responses from 402 student samples. The findings are in Table 4, showing that each criterion of AIGD demonstrates a statistically significant positive correlation with the VIEW model. The criterion of N-normative for AIGD represents the strongest relationship with I-inform of VIEW.

In following the N-normative, the choice of *providing practical environmental knowledge* for AIGD can support environmental communication to have *good visual effects* (0.690), effectively *attract audience attention* (0.661), and *facilitate rapid understanding* of environmental issues (0.650), those in the I-inform of VIEW. Also, the I-innovative criterion of AIGD in *raising awareness of environmental protection* demonstrates the strongest relationship with the I-inform of VIEW on *facilitating rapid understanding* (0.646). Similarly, both the AIGD criteria of A-aesthetic in *better understanding climate crisis* and E-effect in *encouraging environmental action* have the strongest relationship; 0.655 and 0.605, respectively to I-inform of VIEW on helping environmental communication *have good visual effects*. Included is the E-effect on *prompting environmental behaviour improvement* of AIGD that meets the E-educate of VIEW by facilitating memory of information (0.618). Though every criterion of AIGD has a strongly positive correlation with the VIEW, the comparative correlation among the VIEW is somewhat different. The least correlation of every criterion belongs to the V-verify for *providing rich environmental information* and performing environmental communication with *scientifically verified in accuracy*. The values are 0.588, 0.560, 0.528, and 0.522 for normative, innovative, aesthetics, and effect, respectively.

Table 4. Correlation of NIAE criteria for AIGD and environmental communication in VIEW model

EC: VIEW / AIGD:NIAE		Verify			Inform			Educate		Warning	
		Rich environmental information	Scientifically verified	Fact	Attract attention	Facilitate rapid understanding	Good visual effects	Easy to understand	Facilitate memory of information	Have warning information	Drive environmentally friendly behavior
Normative	Practical environmental knowledge	0.606**	0.588**	0.597**	0.661**	0.650**	0.690**	0.603**	0.589**	0.625**	0.637**
Innovation	Raise awareness of environmental protection	0.560**	0.596**	0.585**	0.625**	0.646**	0.634**	0.567**	0.636**	0.635**	0.631**
Aesthetic	Better understand climate change crisis	0.528**	0.533**	0.529**	0.634**	0.628**	0.655**	0.552**	0.556**	0.581**	0.619**
Effect	Encourage environmental action	0.545**	0.552**	0.560**	0.578**	0.584**	0.605**	0.571**	0.560**	0.579**	0.552**
	Prompt to improve environmental behavior	0.573**	0.522**	0.533**	0.581**	0.609**	0.590**	0.580**	0.618**	0.604**	0.603**
* p<0.05 ** p<0.01: Coorelation is significant at the 0.01 level (2-tailed)											

The correlation between AIGD and VIEW model is in brief that visual design still plays a key role in enhancing the attractiveness and readability of environmental communication. AI visual communication has achieved some results, but it should not be over-relied on AIGD. Visual effects have a positive influence on environmental communication because visual appeal is an important auxiliary factor to environmental communication. The

optimal strategy is to ensure that the content of the message is clear, while considering the visual presentation to maximize the effectiveness (18).

Influence of AIGD on environmental communication

Figure 2-4. The student works of AIGD for environmental communication focusing on I-inform and E-educate rather than V-verify and W-warning.

Based on the tasks using AIGD for environmental communication on VIEW model, it is found that in terms of the overall scoring trend, the score of VIEW is relatively stable, indicating that most works do not deviate greatly in these four dimensions, but there are still some works with more outstanding performance in individual dimensions. By viewing the score distribution, the following characteristics are found. First, the VIEW scores of most works are mainly 4 and 5 points, and low scores (1-2 points) are rare. Secondly, the scoring consistency is high. In VIEW, the variation of scores is small, and there is no extreme score (such as 1 or 2 points), indicating that the scoring standards of the students are stable. Thirdly, the VIEW score is generally high. This indicates that among the elements of VIEW, the students generally recognize the performance of the works and may hold a relatively positive evaluation for the overall values of VIEW for environmental communication.

To further clarify the role of VIEW in different works, the author finds out the works with high scores mostly getting from the dimensions of I-inform and E-educate, indicating that the clear information in content dissemination and strong educational value is concerted in the works. For the works with a high rating in W-warning, they have a strong visual influence in environmental communication and can arouse the attention and alert of the audience. The works emphasize V-verify and I-inform together, indicating that they are excellent in scientific and data support, and can provide reliable sources of information.

It is also found that the works with low AIGD score but high score in environmental communication show that works with strong information transmission (I-inform) and educational (E-educate) are prone to have their characteristics. The explanations are as follows.

First, AIGD helps provide clear information transmission and reasonable logical structure in environmental communication, especially with I-inform dimension, which is prominent. It is also possible that they may be common in visual design, but the core value of environmental information transmitted is still strong.

Second, environmental communication must employ educational and cautionary aspects as E-educate and W-warning dimensions are prominent. The work may use strong textual descriptions, realistic examples, or shocking data support to make up for visual deficiencies. In case the visual effects are not outstanding, the content with E-educate and W-warning can alert the audience and achieve the purpose of environmental communication.

Third, a low AIGD score can still have some negative effects, especially in terms of lack of visual appeal and unclear communication of complex information. This is concurrent to the implication that AIGD with poor visual performance may cause the audience to lose interest. The audience may need more time and energy to interpret the information, which reduces communication efficiency in the reception of the message though visual design can help the audience quickly understand complex information (19).

Fourth, visualization and artistic expression of information are the key factors of graphic design potential to enhance the effect of environmental communication and improving environmental concern.

Fifth, all the works indicate the fact that the quality of environmental communication through AIGD requires the skills in using color, size, animation and other ways to highlight the most important information, improve the audience's attention, enhance the sense of layering, and optimize the contrast of text and images to ensure core information is not lost in complex designs.

Sixth, there is no work using AI to generate realistic images of environmental events so that the communication content is more credible and emotionally attractive.

Finally, efficiency in environmental communication with AIGD is also dependent on the ability to generate vivid illustrations of environmental themes and make content more engaging (20).

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