AI and Immersive Technology for Crisis Communication and Public Relations

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Abstract:

In order to navigate difficult crises and sustain public trust, it is necessary to develop unique tactics that can adapt to the always evolving environment of crisis communication. This article examines the capacity of Artificial Intelligence (AI) and immersive technologies to transform crisis communication and public relations (PR). This paper analyzes the utilization of AI-driven content generation and sentiment analysis to customize messages, combat misinformation, and optimize communication strategies. This article also examines the capabilities of Chabot's and virtual assistants in crisis response, as well as the ethical implications of utilizing AI-generated material. The distinct experiences created by immersive technologies like augmented reality (AR), virtual reality (VR), or mixed reality (MR) by merging physical world with the digital world can play an important role in effective crisis communication. This article explores the utilization of immersive technologies such as Virtual Reality (VR) for training in crisis preparedness and Augmented Reality (AR) for the immediate distribution of information during crises. The paper assesses the capacity of augmented reality (AR) to enhance public education regarding crisis scenarios. Meta-analysis has been used to review the literature related to use of immersive technology during crisis.

Keywords: Augmented Reality, Crisis Communication, Immersive Technologies, Pandemic, Virtual Reality.

INTRODUCTION

In the present era of extensive interconnectivity, crises have the potential to arise and disseminate information at an unparalleled speed. Efficient crisis communication, which is the fundamental aspect of public relations (PR), is crucial for organizations maneuvering through these tumultuous periods. Conventional approaches, however useful, frequently

face challenges in keeping up with the rapidly changing nature of contemporary emergencies.

Communication plays an important role to fight against any crisis situation. Effective crisis communication can help people in dealing with this challenging situation. According to Timothy Coombs, Crisis communication expert, Texas A&M University, clear and accurate communication with the public is the best way to prevent the spread of the virus. A study conducted by Pew Research Centre revealed that the dependency of population on digital connections for work, education, health care, daily transactions and essential social interactions may result in deeper relationship and more dependency on technology by the year 2025. At this time, the innovative communication strategies with the help of technology to avoid physical presence are highly required. The distinct experiences created by immersive technologies like augmented reality (AR), virtual reality (VR), or mixed reality (MR) by merging physical world with the digital world can play an important role in effective crisis communication. Virtual reality (VR) and augmented reality (AR) tools can be used to generate awareness among people related to vaccination, healthcare and ways of protecting themselves from the virus.

This study investigates the capacity of Artificial Intelligence (AI) and immersive technologies to bring about significant changes in crisis communication and public relations (PR). Artificial intelligence (AI) provides a range of tools for analyzing large volumes of data, customizing messaging, and automating processes, which promotes a more focused and effective approach. Immersive technologies such as Virtual Reality (VR) and Augmented Reality (AR) offer innovative opportunities to train crisis responders and share information with the public in a more captivating and interactive manner.

This article explores the ways in which artificial intelligence (AI) and immersive technology might be utilized to improve several facets of crisis communication. We explore the utilization of artificial intelligence (AI) in generating content, analyzing sentiment, and developing Chabot's, which eventually enables a more planned and prompt approach to crisis management.

In addition, the article examines the use of virtual reality (VR) for training in crisis preparedness and augmented reality (AR) for delivering real-time information in crucial situations. We assess the prospective advantages and constraints of these technologies, in addition to the ethical concerns that necessitate attention for responsible application.

This research seeks to enhance public relations techniques in navigating the difficulties of the modern world by analyzing the convergence of artificial intelligence, immersive technologies, and crisis communication. This paper has attempted to review the literature related to use of AI and immersive technology, explored the various benefits provided by these technologies in effective communication during crisis.

AI for Effective Crisis Communication

Crisis manifests in several ways, including uncertainty, conflict, instability, and emergencies. It can occur suddenly, last for a brief period, or extend over a prolonged duration. According to Sohn and Lariscy (2014), a crisis is a period characterized by severe challenges, problems, or risks that have a global impact and can occur on a large scale in some regions. In the era of excessive information, where emergencies can rapidly escalate and disseminate false information, the importance of efficient crisis communication is more than ever. Although traditional methods are valuable, Artificial Intelligence (AI) provides a potent array of tools to transform how organizations manage these complex situations. AI can be in the below mention ways for effective crisis management:

Content Generation: Artificial intelligence can be utilized to produce precise, succinct, and accurate updates in the midst of a crisis. This feature might be especially advantageous for generating content in multiple languages or disseminating updates across different platforms.

Sentiment Analysis: Artificial intelligence has the capability to analyze extensive volumes of data obtained from social media and news platforms in order to comprehend the prevailing public sentiment around the problem. This enables organizations to customize their communication to target specific issues and anxieties.

Targeted Communication: AI can utilize demographic data and previous interactions to analyze and categories audiences, enabling the delivery of precise and impactful messaging. This guarantees that vital information is delivered to the appropriate individuals in a timely manner.

Real-time Monitoring: Artificial intelligence has the capability to constantly monitor internet interactions and news stories, enabling organizations to promptly detect and tackle disinformation and rumors.

Chabot's and virtual assistants: AI-driven Chabot's and virtual assistants are capable of addressing often asked inquiries, so allowing human resources to allocate their attention towards other crucial responsibilities. This can be particularly beneficial during the early stages of knowledge distribution.

Predictive Analytics: Artificial intelligence has the capability to examine past data in order to detect and anticipate prospective crisis scenarios before they occur. This enables organizations to design proactive communication plans and minimize potential harm.

AI-driven Sentiment Analysis during Crisis

Through the responsible utilization of AI-driven sentiment analysis, organizations can get a more profound comprehension of public perception in times of crisis. This essential knowledge enables individuals to customize their communication strategy, establish trust, and ultimately handle the situation more efficiently.

Crises elicit a tumultuous range of emotions. Social media and news sites are inundated with a plethora of opinions, worries, and occasionally inaccurate information. Amidst this chaotic situation, it is essential to comprehend the prevailing public opinion in order to communicate effectively during a crisis. AI-driven sentiment analysis provides organizations with a robust tool to manage complex circumstances.

AI-driven sentiment analysis refers to the process of using artificial intelligence techniques to analyze and interpret the sentiment or emotion expressed in a given text or piece of data. Sentiment analysis is a method that employs machine learning algorithms to automatically classify text data (such as social media posts and news articles) as positive, negative, or neutral in relation to a certain event or topic. Through the real-time analysis of extensive data, artificial intelligence (AI) has the capability to offer vital insights on public sentiment during a crisis.

Advantages of utilizing AI-powered sentiment analysis in times of crisis:

Public concerns can be identified by AI, as it has the ability to accurately identify and analyze the main worries and fears that are being discussed and circulated during a crisis. This enables organizations to customize their communication strategy in order to successfully handle those particular concerns.

To combat disinformation, organizations should proactively address negative attitude and potential rumors by providing real information, thereby reducing the spread of false or misleading information.

By employing AI, organizations may effectively priorities their communication efforts by identifying the demographics or regions that exhibit the greatest levels of worry. This enables them to allocate resources and disseminate information in a more targeted manner. Lastly, utilizing sentiment analysis helps quantify the level of public trust in the organization's

handling of the problem. This feedback loop enables the implementation of modifications and enhancements in communication tactics.

Immersive Technology for Crisis Training and Education

Virtual Reality

Virtual reality (VR) which is also known as virtual environment is an advanced human-computer interface which is capable of stimulating realistic environment. The experiences provided by VR are similar to real world. VR systems use VR head-sets which has head mounted display. There are two types of virtual reality; immersive VR and text-based network VR. Using avatar-based VR, people can enjoy virtual environment in the form of real video. The first VR software was introduced in the 1994 by the name Virtual reality Modelling Language. Use of virtual reality is common in video game, 3D cinema. The restrictions imposed by COVID-19 pandemic in the year 2020 have given rise to VR technology.

Augmented Reality

Augmented reality enhanced the objects of the real world with the help of computer-generated perceptual information. AR alters the perception of real world of an individual as compared to VR which completely replaces the real-world environment. The information of the individual's surrounding world can be digitally manipulated in order to make more immersive and interactive. The uses of AR tools are popular among marketers in order to sell their products to the consumers, creating interactive experiences for school children in learning process. It has the capability to facilitate social interaction. Healthcare, airline and military sector have also used AR technology.

Preparedness is necessary due to the unpredictable nature of disasters. Conventional training approaches, however beneficial, often face difficulties in accurately reproducing the stress and intricacies of real-life scenarios. Immersive technologies such as Virtual Reality (VR) and Augmented Reality (AR) provide a groundbreaking method for crisis training and education.

Immersing oneself in a simulated environment:

Virtual Reality (VR) technology enables the creation of a completely immersive virtual environment, allowing trainees to be placed directly into simulated crisis circumstances. This enables them to:

Practice making decisions: Trainees are able to simulate the sights, sounds, and feelings of a crisis in order to practice making decisions in a secure and regulated setting. **Enhance Crisis Response Abilities:** Virtual reality simulations can be customised to particular situations, allowing trainees to acquire and refine vital skills such as emergency medical assistance, evacuation protocols, and effective crisis communication.

Improve Situational Awareness: Through the use of virtual reality, trainees can be fully engaged in lifelike simulations, which can significantly increase their perception of their environment and the possible risks that may arise during a crisis.

Augmented Reality: Combining Real World with Digital Information Augmented reality superimposes digital information over the physical environment. This technique has multiple applications in crisis training and education:

Interactive Training Tools: AR applications can be created to offer immediate and precise information and directions during training sessions. Visualize firefighters utilizing augmented reality (AR) technology to swiftly and accurately identify dangerous substances, or envision first responders receiving real-time medical data superimposed on a patient.

Awareness: Public education and awareness can be enhanced by the use of augmented reality (AR) applications, which can provide information and instruction on different crisis circumstances. Users can utilize augmented reality overlays to investigate potential evacuation routes, acquire knowledge about emergency preparedness supplies, and engage in basic first aid training.

Remote Training and Collaboration: Augmented Reality (AR) enables the possibility of conducting training sessions remotely, where instructors can provide guidance to trainees in real-world settings, regardless of their physical location.

Although immersive technologies have great potential, there are obstacles that need to be address such as the implementation of VR and AR technology might incur significant expenses, which can restrict access for certain organizations and individuals. Technical proficiency is necessary for creating impactful immersive training experiences, and it also demands continuous software updates.

Some users may have motion sickness when exposed to virtual reality (VR) situations. Thorough planning and thoughtful attention to user experience are essential.

Advancing with Immersive Learning

Although there are difficulties, the prospective advantages of immersive technology in crisis training and instruction are unquestionable. With the ongoing advancement and increasing

availability of technology, we may anticipate a surge in immersive learning experiences that will have a profound impact on the development of persons who are better equipped and trained to handle crises.

METHEDOLOGY

In the chaotic throes of a crisis, clear and concise communication is paramount. Augmented Reality (AR) and Virtual Reality (VR) offer innovative tools that can be harnessed to enhance crisis communication in several ways:

1. Real-Time Information Dissemination with AR: Overlays for Evacuation Routes: Imagine AR apps displaying evacuation routes overlaid on real-world environments. Users could point their phones and see the quickest escape paths highlighted, even in unfamiliar surroundings. First Aid Instructions: AR overlays can display step-by-step first aid instructions on a user's field of view, enabling bystanders to assist injured individuals more effectively during a crisis. Safety Information Overlays: AR can overlay real-time information on buildings or areas affected by the crisis. This could include warnings about hazardous materials, structural instability, or critical utility shutdowns.

2. VR Simulations for Crisis Response Training: Immersive Training for First Responders: VR can create realistic simulations of various crisis scenarios like fires, natural disasters, or hostage situations. This allows first responders to practice decision-making and hone their response skills in a controlled environment. Crisis Communication Training: VR simulations can be designed to train public officials and spokespersons on delivering effective crisis communication messages under pressure. This can be particularly beneficial for practicing responses to media inquiries and public addresses. Building Situational Awareness: By immersing trainees in realistic VR scenarios, they can develop a heightened awareness of potential hazards and environmental cues crucial for effective response.

3. Public Education and Awareness with AR/VR: Interactive Crisis Preparedness Apps: AR apps can be developed to educate the public on various crisis situations. Users could explore potential evacuation routes in their neighborhoods, virtually assemble emergency preparedness kits, or practice basic first aid using AR overlays. VR simulations for Public Empathy Building: VR experiences can be designed to help people understand the perspectives of those directly affected by a crisis. This can foster empathy and encourage a sense of community preparedness.

Currently very limited studies are available which have reviewed the applicability of augmented and virtual reality tools in the crisis situation for effective communication.

This research has attempted meta-analysis to systematically analyse the available studies related to the use of augmented and virtual reality tools in the crisis situation for effective communication.

2.1- Database Review

The researcher has attempted to review the available studies based on AR and VR applications and their usage in crisis situation including the COVID-19 pandemic. Scopus, Google scholar database and other relevant websites have been searched to find out the review of literature.

2.2. Criteria of Selection

The studies which have defined the use of AR, VR technology and AI and their applicability in any kind of health crisis, pandemic or disaster management have been considered and included in the analysis. The researcher has screened the papers/studies as per their title, abstract and the final conclusion of the studies.

RESULTS

Following studies has been analysed to understand the various advantages and usage of immersive technologies in the crisis.

S.NO	TECHNOLOGY	STUDY TITLE	USAGE TYPE AT THE TIME OF CRISIS	ADVANTAGE OF TECHNOLOGY
1	**Virtual Reality**	Virtual reality tools for development of infection control solution	To develop improved infection control solutions	Improved systems for evaluating the effectiveness of a proposed infection control solution
2	**Virtual Reality**	Industry 4.0 technologies and their applications in fighting COVID-19 pandemic	Detection of COVID 19 pandemic with the help of technologies of Industry 4.0	Capability to provide innovative ideas and solution to fight against global medical emergencies.
3	**Virtual Reality**	Using immersive virtual reality to improve the beliefs and intentions of influenza vaccine avoidant 18-to-49-year-olds: Considerations, effects, and lessons learned	To effectively communicate the immunization concepts with help of VR.	Technology has potential to convey the key concept.

4	**Virtual Reality**	Virtue - a virtual reality trainer for hand hygiene	Virtual training environment for hand hygiene	VR technology enhanced learning and motivated hand hygiene behaviour.
5	**Virtual Reality**	Application of Virtual Reality Technology in Disaster Medicine	Introduction and future prospects of VR technology in disaster medical field.	VR is one of the influential technologies which can be combined with disaster medicines for providing systematic education, knowledge popularisation and skills development.
6	**Augmented reality**	EON Reality Releases New Remote AR and VR Packages for Education, Government, and Industry (Website Article)	Providing remote packages for Education, Government and Communication in COVID 19.	The technology has transformed the lives of several people in different countries all over the globe.
7	**Augmented reality**	Mobile Augmented Reality for Risk and Crisis Communication in Disaster Management (Chapter in a Book)	Use of Mobile Augmented reality (mAR) in crisis communication	Augmented reality (mAR) has great potential for risk and crisis management
8	**Augmented reality**	Effects of Self-focused Augmented Reality on Health Perceptions During the COVID-19 Pandemic: A Web-Based Between-Subject Experiment	Use of AR technology in making health strategy during Covid-19	Combining AR with vicarious reinforcement may result in effective health communication strategy
9	**Augmented reality**	A Survey of Augmented Reality	Use of AR technology in various fields	This study was survey based whci can be considered as the starting point for those who are interested in the useage of AR tools in different fields.
10	**Artificial Intelligence**	A Study of Factors Influencing the Adoption of Artificial Intelligence in Crisis Management	Use of AI in crisis management	The study highlights 28 aspects related to the use of artificial intelligence (AI), which are classified into seven groups: Large-Scale Machine Learning, Deep Learning, Reinforcement Learning, Robotics, Computer Vision, Natural Language Processing, and Internet.
11	**Artificial Intelligence**	Artificial Intelligence in Disaster Risk Communication: A Systematic Literature Review	AI in Disaster Risk Communication	The study revealed that research endeavors primarily concentrate on two overarching domains: (1) prognostication and surveillance for prompt detection, and (2) data extraction and categorization for comprehensive understanding of the issue.
12	**Artificial Intelligence**	Artificial Intelligence: A Strategic Disruption in Public Relations	AI in Public Relations	The role of AI-based systems as a strategic disruption in the PR sector.

CONCLUSION

The dynamic and always changing field of crisis communication necessitates a continuous search for inventive and forward-thinking solutions. This investigation into Artificial Intelligence (AI) and immersive technology has revealed a future filled with possibilities for enhancing PR campaigns in crucial circumstances. Artificial intelligence enables organizations to analyses large volumes of data, personalize communication, and automate operations, promoting a focused and efficient approach. Virtual Reality (VR) and Augmented Reality (AR) provide innovative methods for educating crisis responders and sharing information with the public in a highly engaging and interactive manner. Nevertheless, the achievement of effectively combining AI and immersive technologies relies on the responsible execution of the integration. Transparency, ethical considerations, and ongoing human supervision are essential to guarantee impartial communication and minimize unforeseen repercussions.

The future of crisis communication rests on a collaborative approach as we progress. By utilizing artificial intelligence and immersive technology in conjunction with human skill and empathy, organizations can establish trust, navigate crises with more efficiency, and eventually cultivate a more resilient society. In order to provide fair access to these transformational tools, it is necessary to conduct continuing research, development, and constant attempts to bridge the digital gap. By embracing this future of collaboration, we can equip individuals and organizations to not only withstand crises but also emerge with greater strength and preparedness.

Asadzadeh, et al, **(2021)**, suggested that the technologies like AR, VR and AI can be utilized in various aspects of crisis situations. The use of VR applications in explaining the importance of hand hygiene to prevent the transmission of deadly virus has been found effective. The study conducted by Nowak, Evans, Wojdynski, et al., (2020) has concluded that VR applications help in understanding the importance of vaccination to fight against the deadly virus. During the crisis situation, for the purpose of effective crisis communication applications of immersive technologies like augmented and virtual realities can be considered. These technologies have the potential to serve the real life like experiences.

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