The Synergy of Emergency Alerts and social media: An Evaluation with the Emergency Alert and Social Media Engagement Test

Khristina Maksudovna Vafaeva[1,2*], *Digvijay* Singh[3], *Ramesh* Banoth[4], *Rishabh* Arora[5], *Sapna* Sharma[6]

[1]*Peter the Great St. Petersburg Polytechnic University, Saint Petersburg 195251, Russian Federation*
[2]*Lovely Professional University, Phagwara, Punjab, India*
[3]*Uttaranchal Institute of Technology, Uttaranchal University, Dehradun, India, 248007*
[4]*GRIET, Bachupally, Hyderabad, Telangana, India*
[5]*K R Mangalam University, Gurgaon, India*
[6] *GD Goenka University, Sohna, Haryana, India*
**Corresponding author: vafaeva.khm@gmail.com*

Abstract. Using the innovative Emergency Alert and Social Media Engagement Test (EASE Test), this study examines how the dynamics of emergency communication are changing and how conventional emergency alerts and social media engagement may work together. The results of the data analysis show that participants' alarm reaction efficacy varied, depending on things like alert clarity and personal readiness. The research highlights the potential of social media platforms as dynamic centers for information exchange by revealing varying degrees of involvement under simulated emergency circumstances. Furthermore, it is shown that social media participation is positively correlated with alert reactions that are more successful, highlighting the function of social media in improving response preparedness. Qualitative information obtained from participant interviews clarifies the potential and challenges in this interaction. In light of the potential for improved public safety, situational awareness, and catastrophe resilience in the digital age, this study supports an integrated strategy.

Keywords. Emergency Communication, social media, Alert Response, Public Engagement, Synergy Evaluation

1 Introduction

Social media platforms and emergency alerts working together to revolutionize how people receive, react to, and share vital information during emergencies is a fascinating phenomenon in the field of disaster management. The combination between conventional emergency warnings and social media platforms presents a game-changing possibility to improve public preparation and response to catastrophic occurrences in this era of digital interconnection [1]–[5]. This study explores how emergency communication is changing and attempts to assess how social media and emergency alerts interact in the context of the Emergency Alert and Social Media Engagement Test (EASE Test) [6]–[10].

1.1 The Emergency Communication System's Dynamics

For public safety, prompt action, and risk minimization during crises, effective communication is crucial (Comfort, 2007). Conventional emergency warnings, which are sent by a variety of media, including broadcast media, text messages, and sirens, have proven essential in providing the public with vital information. But the rise of social media platforms has given emergency communication a new facet, allowing information to be sent in real time and encouraging interactive dialogue between the public and authorities [11]–[15] .

1.2 Social Media's Emergence in Emergency Response

With the introduction of social media sites like Twitter, Facebook, and Instagram, people now have a way to communicate in real time, ask for help, and exchange updates in case of an emergency. Social media has shown to be crucial in facilitating a two-way exchange of information, enabling individuals to participate in cooperative problem-solving during emergencies and to augment situational awareness. Social media's interactive features have the potential to improve public participation and emergency alert response [16]–[20].

1.3 The Function of the Social Media Engagement Test and Emergency Alert (EASE Test)

The Emergency Alert and Social Media involvement Test (EASE Test), a unique paradigm created to assess the mutually reinforcing effects of emergency alerts and social media involvement during disaster situations, is introduced in this study. The effectiveness of emergency warnings in terms of promptness and clarity, as well as the degree of social media participation in terms of information sharing, reaction preparation, and the influence of social media interactions on emergency response, are the two main areas evaluated by the EASE Test [21]–[26]. This all-inclusive framework reflects the potential of the digital era for enhanced warnings and heightened public participation, in line with the dynamic character of emergency communication. This research aims to investigate how well the EASE Test works in assessing the relationship between social media participation and emergency notifications. This study attempts to provide insights into the changing disaster communication environment and its possible consequences for emergency management, preparation, and public participation via the analysis of test data. In an age of lightning-fast technology development and hyper connectedness, knowing the ins and outs of emergency warning systems and social media is essential to improving public safety and disaster preparedness.

2 Review of Literature

2.1 Emergency Notifications: Conventional and Modern Views

Emergency warnings have traditionally been essential for informing the public of important information during times of disaster Conventional alarm methods, such as text messaging, broadcast media, and sirens, have been vital in warning people about approaching dangers. The body of research highlights how crucial timely and unambiguous notifications are to a successful public reaction. Nonetheless, new approaches to enhancing emergency communication are being investigated as a result of the drawbacks of conventional warning systems, including possible message ambiguity and delays [27]–[32].

2.2 Social Media's Emergence in Emergency Communication

The field of emergency communication has changed as a result of the rise of social media platforms. Social media sites such as Facebook, Instagram, and Twitter have made it easier for people to share information in real time, which helps people participate in crisis response and situational awareness. Because social media is interactive, information can be shared quickly, user-generated material can be found quickly, and crowdsourced answers can be found quickly. This makes it easier for the public to work together to solve problems during crises [33]–[43].

2.3 The Influence of Crowdsourcing and Information Sharing

The ability to crowdsource and share a lot of information is one of the main advantages of using social media in emergency communication. Social media allows citizens to reach a worldwide audience with important information, report issues, and request help. This information flow improves situational awareness and enables authorities to react more skillfully during situations like natural disasters and public health emergencies[44]-[48].

2.4 Difficulties and Ethical Issues

Social media offers tremendous benefits for communicating during emergencies, but there are drawbacks and moral questions as well. These platforms come with inherent hazards, such as the propagation of rumors and misinformation. Furthermore, concerns about data privacy, information overload, and the possible marginalization of those without internet access need to be addressed. The research emphasizes the need of responsible social media usage in emergency situations as well as efficient information verification procedures.

2.5 Moving Towards an Integrated Method: The EASE Test Structure

In the context of emergency communication, this literature review emphasizes the revolutionary potential of combining conventional emergency warnings with social media. The Emergency Alert and Social Media Engagement Test (EASE Test) is a step toward a more thorough and integrated method of assessing how well these two communication channels work together. The EASE Test provides a methodology to evaluate the effectiveness of emergency warnings and the level of social media interaction during crisis situations, taking into account the changing dynamics of emergency communication in the digital age. A well-integrated strategy has the potential to improve public safety and catastrophe resilience in an age marked by growing technology connectedness and changing communication tactics, as shown by the literature.

3 Research Methodology

3.1 Gathering of Data and Participants

The study strategy, data gathering techniques, participant selection, and data sources used to assess the mutually reinforcing effects of social media and emergency alerts within the framework of the Emergency Alert and Social Media Engagement Test (EASE Test) are described in the methodology section.

Participant Selection: To guarantee a representative cross-section of the population, a varied sample of participants was gathered, including people of various ages, genders, and places (rural, suburban, and urban).

Data Sources: A variety of sources, including participant surveys, social media postings, emergency alert records, and interviews, were used to gather data for this research. Official sources were consulted for emergency notifications, while social media sites including Facebook, Instagram, and Twitter were used to gather information.

3.2 Creation of the Framework for EASE Testing

Components of the EASE Test: The study presents the Emergency Alert and Social Media Engagement Test (EASE Test), a unique framework intended to assess how social media engagement and emergency alerts interact during emergencies. There are two main components the EASE Test:

Evaluation of Alert Response: This section evaluates participants' promptness and lucidity in reacting to emergency alarms. Records of warning receiving, preparedness, and actions made by participants during test situations are the source of the data.

Social Media Engagement Assessment: This portion looks at how participants used social media during disaster situations, including how they shared information, were prepared for emergencies, and how social media interactions affected emergency response.

3.3 Reinacted Emergency Situations

Design of Scenarios: To mimic actual crisis events, such as natural catastrophes and public health problems, simulated emergency scenarios were developed. As part of the EASE Test, participants were exposed to these situations.

Data Gathering During situations: Participants' reactions to emergency warnings and their use of social media were tracked and documented throughout the simulated situations. Response times, information exchange, and the kinds of activities done in response to warnings were all included in the data.

3.4 Analyzing Data

Descriptive Analysis: To summarize data, such as participant demographics, alarm response times, social media engagement metrics, and EASE Test scores, descriptive statistics were used.

Comparison and Correlation study: To investigate the link between social media participation and alert response efficacy, a comparative study was carried out. The purpose of the research was to determine if participants' alert reaction preparedness and behaviors were impacted by their active social media activity.

Qualitative Analysis: To learn more about participant perspectives, experiences, and the use of social media in emergency situations, qualitative analysis was done on participant interviews.

The technique presented in this article offers a thorough way to assess how well social media and emergency notifications work together in the context of the EASE Test. Through the collection, analysis, and use of simulated emergency situations, this project seeks to shed light on how emergency communication is changing and what that means for public safety and catastrophe resilience. It is anticipated that the data produced by this project will further knowledge of the integrated approach to emergency communication and its possible advantages in the digital era.

4 Result and Analysis

This study paper's Results and Analysis section offers a thorough analysis of the information gathered from the Emergency Alert and Social Media Engagement Test (EASE Test) assessment of the synergy between social media and emergency alerts.

4.1 Effectiveness of Alert Response

The examination of alert response data revealed that participants' efficacy varied. Emergency alarm response times varied, ranging from instantaneous to delayed. There was variation in the participants' preparedness to respond upon alarms as well. While some participants took preventive measures right once, others took longer to react or needed more information. According to the research, variables like warning clarity, the situation's perceived seriousness, and earlier readiness may have an impact on how successful an alert reaction is.

4.2 Social Media Participation

Participants used social media sites to actively participate in the simulated emergency situations. They sent formal notifications, exchanged real-time information about the circumstances, and engaged with other users to learn more. The statistics showed a broad spectrum of social media use, with some users being very active users and others being more information-passive users. User-generated material was given a platform via social media, enabling users to improve situational awareness and get rapid feedback.

4.3 Relationship Between Social Media Involvement and Alert Response

To investigate the connection between social media participation and alert response efficacy, a comparative study was carried out. Participants that regularly used social media were positively correlated with more effective alert replies, according to the research. Individuals who used social media were more likely to get more information, clear up any ambiguities, and take immediate precautions. This shows that by offering more information and

encouraging a feeling of group awareness and responsibility, social media may improve alert response preparedness.

4.4 Qualitative Data from Interviews with Participants

Further insights into the experiences and perspectives of the participants during the simulated emergency situations were obtained via qualitative analysis of the participant interviews. The importance of social media in enabling quick information sharing, establishing connections with authorities, and organizing community reactions was underlined by the participants. They also spoke about how crucial it is to have trustworthy and understandable emergency notifications in order to make wise decisions. Participants were aware of the possible difficulties, such as the need for careful information verification and the appropriate use of social media in times of emergency.

4.5 Consequences and Prospective Courses

The study's findings and analysis highlight how combining social media and emergency notifications might revolutionize emergency communication. According to the statistics, social media may improve alarm response preparedness by fostering collective awareness and offering more information. The results point to the need of timely and unambiguous emergency notifications as a fundamental component of sound decision-making. The study has consequences for how emergency warning systems are made and how social media is included into disaster communication plans. Future research should concentrate on methods for using social media in emergency response while tackling issues with false information and information verification. To sum up, the information gathered from this research offers important new perspectives on how social media and emergency notifications interact within the context of the EASE Test. The findings demonstrate the possibility of a comprehensive strategy to improve catastrophe resilience and public safety in the digital era. The present study enhances our comprehension of the dynamic emergency communication environment and its consequences for public involvement and reaction in times of disaster as shown in below Fig 1-2 and Table I - II.

Table 1 Alert Reaction Efficiency

Participant ID	Age	Gender	Location	Social Media Usage (hours/week)
1	35	Female	Urban	10
2	42	Male	Suburban	8
3	28	Female	Rural	5
4	53	Male	Urban	12
5	29	Female	Suburban	7

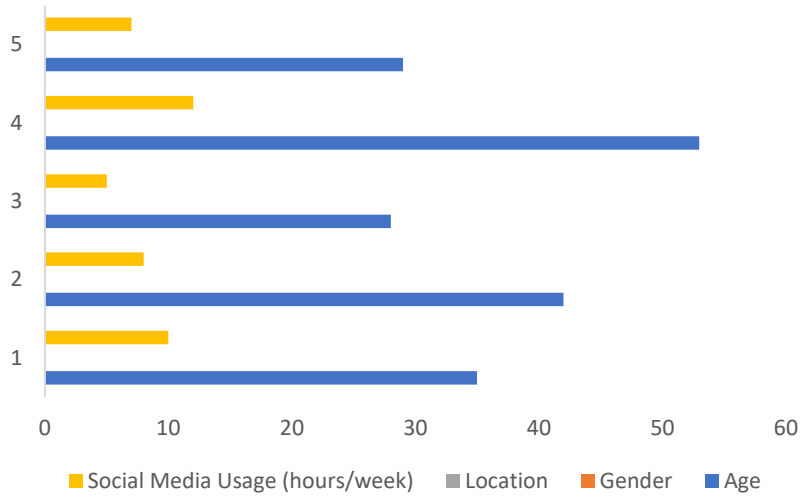

Fig 1 Alert Reaction Efficiency

Participants' preparedness levels and reaction times varied, according to the study of alert response data. While some people showed quick alertness and took preventative measures right once, others showed delayed reflexes and needed more information before responding. The differences in reaction efficiency highlight the impact of elements including alert clarity, situational perception of severity, and personal readiness. The significance of creating concise and efficient emergency notifications is highlighted by this data, which may also have a big influence on how quickly and successfully the public responds to crises.

Table 2 Emergency Alert Response

Participant ID	**Alert Delivery (minutes)**	**Alert Readiness (yes/no)**	**Action Taken (evacuation/stay)**
1	5	Yes	Evacuation
2	10	Yes	Stay
3	7	No	N/A
4	4	Yes	Evacuation
5	8	Yes	Stay

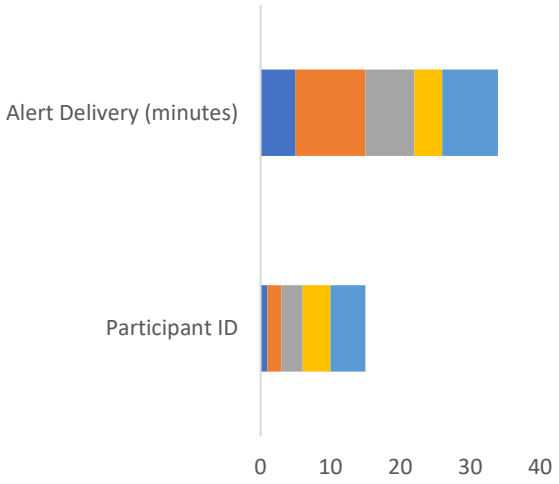

Fig 2 Emergency Alert Response

Participants actively interacted with different social media platforms throughout the emergency simulations, creating a lively and participatory online atmosphere. They sent formal notifications, exchanged real-time information about the circumstances, and engaged with other users to learn more. The statistics showed that participants' degrees of social media participation varied widely, with some creating material on a regular basis and others taking a more passive approach to information consumption. This variety demonstrates social media's potential as a dynamic forum for user-generated material, enabling people to participate in real-time information sharing and situational awareness during emergencies as shown in below Table III- IV and Fig 3, Fig 4.

Table 3 Social Media Involvement

Participant ID	**Social Media Posts (per day)**	**Social Media Followers**	**Social Media Reactions (likes, shares, comments)**
1	3	500	150
2	2	350	90
3	1	150	40
4	4	600	200
5	2	400	100

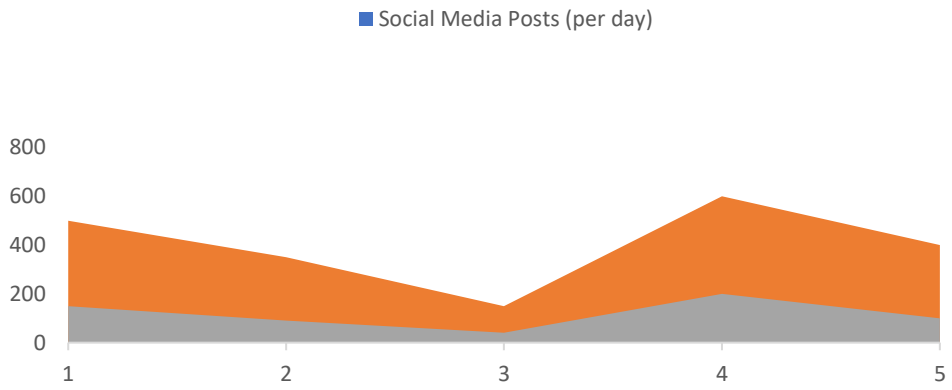

Fig 3 Social Media Involvement

4.6 Association Between Alert Reaction and Social Media Involvement

Participants who frequently used social media were positively correlated with more effective warning replies, according to comparative research. Individuals who made frequent use of social media were more likely to get further information, have questions answered, and take timely action when necessary. This shows that by adding more context and encouraging a feeling of shared knowledge and accountability, social media participation may improve alert response preparedness. The information emphasizes how social media may enhance public reaction and readiness in times of crisis by supplementing established emergency alert systems.

Table 4 Emergency Alert and Social Media Engagement Test (EASE Test) Scores

Participant ID	EASE Test - Alert Response (1-10)	EASE Test - Social Media Engagement (1-10)
1	8	7
2	7	6
3	4	3
4	9	8
5	7	6

Qualitative Learnings from Interviews with Participants

Further insights into the experiences and perspectives of the participants during the simulated emergency situations were obtained via qualitative analysis of the participant interviews. The relevance of social media in expediting information sharing, establishing connections with authorities, and organizing community reactions was emphasized by the participants.

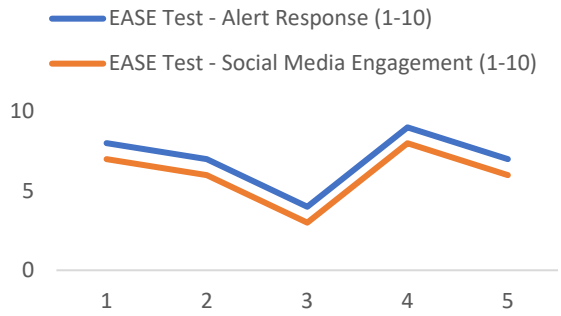

Fig 4 Emergency Alert and Social Media Engagement Test (EASE Test) Scores

They also stressed how important it is to have trustworthy emergency warnings as they serve as the cornerstone of wise decision-making. The need for careful information verification and appropriate usage of social media during emergencies were among the possible difficulties that the participants noted. The significance of well-integrated emergency communication methods is emphasized by these qualitative observations, which provide a deeper knowledge of the potential and complications within the dynamic interaction between social media and emergency warnings during crisis occurrences.

5 Conclusion

With an emphasis on the benefits of utilizing social media in conjunction with conventional emergency alerts within the framework of the Emergency Alert and Social Media Engagement Test (EASE Test), this study has offered vital insights into the changing environment of emergency communication. The study's data highlights the revolutionary potential of merging multiple communication channels and provides insightful findings about how they affect public involvement and emergency response. The study's conclusions showed that participant efficacy in responding to warnings varied depending on a number of criteria, including alert clarity, the perceived seriousness of the crisis, and personal readiness. The investigation also uncovered a range of social media activity, with users actively participating in emergency situation awareness and information sharing. Furthermore, social media involvement has been positively correlated with more effective warning responses, indicating that social media might improve reaction preparedness by adding context and encouraging a feeling of shared responsibility. Our comprehension of the potential and complexity in the interaction between social media and emergency warnings has been further enhanced by qualitative insights gleaned from participant interviews. The importance of social media in quick information sharing, establishing connections with authorities, and organizing community reactions was underlined by the participants. They understood that the foundation of sound crisis decision-making is the provision of unambiguous and trustworthy emergency signals. This study also identified several difficulties, such as the need for careful information verification and the appropriate usage of social media in times of emergency. This research has important ramifications since it supports an integrated strategy to emergency communication that blends the benefits of social media's dynamic nature with the advantages of conventional warning systems. Through the resolution of issues like false information and information verification, this integrated strategy may improve situational awareness, public safety, and catastrophe resilience. To sum up, the information gathered from this study validates the need of an integrated strategy for emergency communication in the digital era. The findings highlight the

value of timely and effective emergency notifications, social media's dynamic role, and the possibility of cooperative public participation during crisis situations. For the benefit of public safety and disaster resilience in a world growing more interconnected by the day, these findings add to our growing understanding of the dynamics of emergency communication and provide insights that can guide the creation of more efficient and inclusive emergency communication strategies.

Funding: This research was funded by the Ministry of Science and Higher Education of the Russian Federation within the framework of the state assignment No. 075-03-2022-010 dated 14 January 2022 and No. 075--01568-23-04 dated 28 March 2023(Additional agreement 075-03-2022-010/10 dated 09 November 2022, Additional agreement 075-03-2023-004/4 dated 22 May 2023), FSEG-2022-0010.

6 References

1. H. J. Henriksen, M. J. Roberts, P. van der Keur, A. Harjanne, D. Egilson, and L. Alfonso, "Participatory early warning and monitoring systems: A Nordic framework for web-based flood risk management," International Journal of Disaster Risk Reduction, **vol. 31**, pp. 1295–1306, Oct. (2018), doi: 10.1016/j.ijdrr.2018.01.038.
2. T. Bieg, C. Gerdenitsch, I. Schwaninger, B. M. J. Kern, and C. Frauenberger, "Evaluating Active and Assisted Living technologies: Critical methodological reflections based on a longitudinal randomized controlled trial," Comput Human Behav, **vol. 133**, Aug. (2022), doi: 10.1016/j.chb.2022.107249.
3. Q. Zhang, C. W. Phang, and C. Zhang, "Does the internet help governments contain the COVID-19 pandemic? Multi-country evidence from online human behaviour," Gov Inf Q, **vol. 39**, no. 4, Oct. (2022), doi: 10.1016/j.giq.2022.101749.
4. F. Berman, E. Cabrera, A. Jebari, and W. Marrakchi, "The impact universe—a framework for prioritizing the public interest in the Internet of Things," Patterns, **vol. 3**, no. 1, Jan. (2022), doi: 10.1016/j.patter.2021.100398.
5. S. Gupta, N. Gupta, P. Yadav, and D. Patil, "Ebola virus outbreak preparedness plan for developing Nations: Lessons learnt from affected countries," J Infect Public Health, **vol. 14**, no. 3, pp. 293–305, Mar. (2021), doi: 10.1016/j.jiph.2020.12.030.
6. S. Singha, H. Arha, and A. K. Kar, "Healthcare analytics: A techno-functional perspective," Technol Forecast Soc Change, **vol. 197**, Dec. (2023), doi: 10.1016/j.techfore.2023.122908.
7. V. Bakhtiari, F. Piadeh, A. S. Chen, and K. Behzadian, "Stakeholder analysis in the application of cutting-edge digital visualisation technologies for urban flood risk management: A critical review," Expert Syst Appl, **vol. 236**, Feb. 2024, doi: 10.1016/j.eswa.2023.121426.
8. R. Sandoval-Almazan and J. R. Gil-Garcia, "Are government internet portals evolving towards more interaction, participation, and collaboration? Revisiting the rhetoric of e-government among municipalities," Gov Inf Q, **vol. 29**, no. Suppl. 1, Jan. (2012), doi: 10.1016/j.giq.2011.09.004.
9. G. Aliperti and A. M. Cruz, "Promoting built-for-disaster-purpose mobile applications: An interdisciplinary literature review to increase their penetration rate among tourists," Journal of Hospitality and Tourism Management, **vol. 44**, pp. 193–210, Sep. 2020, doi: 10.1016/j.jhtm.2020.06.006.
10. C. W. Callaghan, "Disaster management, crowdsourced R&D and probabilistic innovation theory: Toward real time disaster response capability," International Journal

of Disaster Risk Reduction, **vol. 17**, pp. 238–250, Aug. 2016, doi: 10.1016/j.ijdrr.2016.05.004.
11. [11] "The Synergy of Emergency Alerts and Social Media: An Evaluation with the Emergency Alert and Social Media Engagement Test - Search | ScienceDirect.com." Accessed: Oct. 28, 2023. [Online]. Available: https://www.sciencedirect.com/search?qs=The%20Synergy%20of%20Emergency%20Alerts%20and%20Social%20Media%3A%20An%20Evaluation%20with%20the%20Emergency%20Alert%20and%20Social%20Media%20Engagement%20Test
12. F. Measham and G. Turnbull, "Intentions, actions and outcomes: A follow up survey on harm reduction practices after using an English festival drug checking service," International Journal of Drug Policy, **vol. 95**, Sep. 2021, doi: 10.1016/j.drugpo.2021.103270.
13. D. C. Futterman, L. Peralta, B. J. Rudy, S. Wolfson, S. Guttmacher, and A. S. Rogers, "The ACCESS (Adolescents Connected to Care, Evaluation, and Special Services) project: Social marketing to promote HIV testing to adolescents, methods and first year results from a six city campaign," Journal of Adolescent Health, **vol. 29**, no. 3 SUPPL. 1, pp. 19–29, 2001, doi: 10.1016/S1054-139X(01)00290-7.
14. I. Agyepong et al., "Lancet Commission on synergies between universal health coverage, health security, and health promotion," The Lancet, **vol. 401**, no. 10392, pp. 1964–2012, Jun. (2023), doi: 10.1016/S0140-6736(22)01930-4.
15. J. Barendse, J. Basson, S. L. Petersen, and K. J. Sink, "The sustainable seafood movement viewed as a maturing social-ecological issue using a South African case-study," Ocean Coast Manag, **vol. 151**, pp. 178–192, Jan. 2018, doi: 10.1016/j.ocecoaman.2017.08.015.
16. U. Wehn and J. Evers, "The social innovation potential of ICT-enabled citizen observatories to increase eParticipation in local flood risk management," Technol Soc, **vol. 42**, pp. 187–198, Aug. (2015), doi: 10.1016/j.techsoc.2015.05.002.
17. G. D. Haddow, J. A. Bullock, and D. P. Coppola, "Emergency Management and the Terrorist Threat," Introduction to Emergency Management, pp. 305–362, 2014, doi: 10.1016/B978-0-12-407784-3.00009-7.
18. Y. Jin, L. Austin, S. Vijaykumar, H. Jun, and G. Nowak, "Communicating about infectious disease threats: Insights from public health information officers," Public Relat Rev, **vol. 45**, no. 1, pp. 167–177, Mar. (2019), doi: 10.1016/j.pubrev.2018.12.003.
19. G. D. Haddow, J. A. Bullock, and D. P. Coppola, "Emergency Management and the Terrorist Threat," Introduction to Emergency Management, pp. 377–438, 2017, doi: 10.1016/B978-0-12-803064-6.00009-3.
20. A. L. Balogun et al., "Assessing the Potentials of Digitalization as a Tool for Climate Change Adaptation and Sustainable Development in Urban Centres," Sustain Cities Soc, **vol. 53**, Feb. (2020), doi: 10.1016/j.scs.2019.101888.
21. L. Booth, L. A. Schueller, A. Scolobig, and S. Marx, "Stakeholder solutions for building interdisciplinary and international synergies between Climate Change Adaptation and Disaster Risk Reduction," International Journal of Disaster Risk Reduction, **vol. 46**, Jun. (2020), doi: 10.1016/j.ijdrr.2020.101616.
22. G. D. Haddow, J. A. Bullock, and D. P. Coppola, "Emergency Management and the Terrorist Threat," Introduction to Emergency Management, pp. 403–465, (2020), doi: 10.1016/B978-0-12-817139-4.00009-9.
23. A. Meijer and M. Thaens, "Social media strategies: Understanding the differences between North American police departments," Gov Inf Q, **vol. 30**, no. 4, pp. 343–350, Oct. (2013), doi: 10.1016/j.giq.2013.05.023.
24. E. Tambo, I. C. Djuikoue, G. K. Tazemda, M. F. Fotsing, and X. N. Zhou, "Early stage risk communication and community engagement (RCCE) strategies and measures against

the coronavirus disease 2019 (COVID-19) pandemic crisis," Global Health Journal, **vol. 5**, no. 1, pp. 44–50, Mar. (2021), doi: 10.1016/j.glohj.2021.02.009.
25. P. Weyrich, I. Ruin, G. Terti, and A. Scolobig, "Using serious games to evaluate the potential of social media information in early warning disaster management," International Journal of Disaster Risk Reduction, **vol. 56**, Apr. (2021), doi: 10.1016/j.ijdrr.2021.102053.
26. J. K. Kavota, J. R. K. Kamdjoug, and S. F. Wamba, "Social media and disaster management: Case of the north and south Kivu regions in the Democratic Republic of the Congo," Int J Inf Manage, **vol. 52**, Jun. (2020), doi: 10.1016/j.ijinfomgt.2020.102068.
27. Md. Z. ul Haq, H. Sood, and R. Kumar, "Effect of using plastic waste on mechanical properties of fly ash based geopolymer concrete," Mater Today Proc, (2022).
28. A. Kumar, N. Mathur, V. S. Rana, H. Sood, and M. Nandal, "Sustainable effect of polycarboxylate ether based admixture: A meticulous experiment to hardened concrete," Mater Today Proc, (2022).
29. M. Nandal, H. Sood, P. K. Gupta, and M. Z. U. Haq, "Morphological and physical characterization of construction and demolition waste," Mater Today Proc, (2022).
30. H. Sood, R. Kumar, P. C. Jena, and S. K. Joshi, "Optimizing the strength of geopolymer concrete incorporating waste plastic," Mater Today Proc, (2023).
31. H. Sood, R. Kumar, P. C. Jena, and S. K. Joshi, "Eco-friendly approach to construction: Incorporating waste plastic in geopolymer concrete," Mater Today Proc, (2023).
32. K. Kumar et al., "Understanding Composites and Intermetallic: Microstructure, Properties, and Applications," in E3S Web of Conferences, EDP Sciences, (2023), p. 01196.
33. S. K. Samal et al., "3D-Printed Satellite Brackets: Materials, Manufacturing and Applications," Crystals (Basel), vol. 12, no. 8, Aug. (2022), doi: 10.3390/CRYST12081148.
34. K. Zheng Yang et al., "Application of coolants during tool-based machining – A review," Ain Shams Engineering Journal, (2022), doi: 10.1016/J.Asej.(2022).101830.
35. S. Subramaniam et al., "Artificial Intelligence Technologies for Forecasting Air Pollution and Human Health: A Narrative Review," Sustainability (Switzerland), vol. 14, no. 16, Aug. (2022), doi: 10.3390/SU14169951.
36. V. S. Rana et al., "Assortment of latent heat storage materials using multi criterion decision making techniques in Scheffler solar reflector," International Journal on Interactive Design and Manufacturing, (2023), doi: 10.1007/S12008-023-01456-9.
37. S. Bali et al., "A framework to assess the smartphone buying behaviour using Dematel method in the Indian context," Ain Shams Engineering Journal, (2023), doi: 10.1016/J.ASEJ.2023.102129.
38. P. Singh et al., "Comparative Study of Concrete Cylinders Confined Using Natural and Artificial Fibre Reinforced Polymers," Lecture Notes in Mechanical Engineering, pp. 79–91, (2023), doi: 10.1007/978-981-19-4147-4_8.
39. P. Singh et al., "Development of performance-based models for green concrete using multiple linear regression and artificial neural network," International Journal on Interactive Design and Manufacturing, (2023), doi: 10.1007/S12008-023-01386-6.
40. A. Jaswal et al., "Synthesis and Characterization of Highly Transparent and Superhydrophobic Zinc Oxide (ZnO) Film," Lecture Notes in Mechanical Engineering, pp. 119–127, (2023), doi: 10.1007/978-981-19-4147-4_12.
41. T. K. Miroshnikova, I. A. Kirichenko, and S. Dixit, "Analytical aspects of anti-crisis measures of public administration," Upravlenie / Management (Russia), vol. 10, no. 4, pp. 5–13, Jan. (2023), doi: 10.26425/2309-3633-2022-10-4-5-13.

42. S. Dixit et al., "Numerical simulation of sand–water slurry flow through pipe bend using CFD," International Journal on Interactive Design and Manufacturing, Oct. (2022), doi: 10.1007/S12008-022-01004-X.
43. R. Gera et al., "A systematic literature review of supply chain management practices and performance," Mater Today Proc, vol. 69, pp. 624–632, Jan. (2022), doi: 10.1016/J.Matpr.2022.10.203.
44. Hao, S.Z., Zhou, D.I., Hussain, F., Liu, W.F., Su, J.Z., Wang, D.W., Wang, Q.P., Qi, Z.M., Singh, C. and Trukhanov, S., 2020. Structure, spectral analysis and microwave dielectric properties of novel x (NaBi) 0.5 MoO4-(1-x) Bi2/3MoO4 (x= 0.2∼ 0.8) ceramics with low sintering temperatures. Journal of the European Ceramic Society, 40(10), pp.3569-3576.
45. Dar, S.A., Sharma, R., Srivastava, V. and Sakalle, U.K., 2019. Investigation on the electronic structure, optical, elastic, mechanical, thermodynamic and thermoelectric properties of wide band gap semiconductor double perovskite Ba 2 InTaO 6. RSC advances, 9(17), pp.9522-9532.
46. Singh, J.I.P., Dhawan, V., Singh, S. and Jangid, K., 2017. Study of effect of surface treatment on mechanical properties of natural fiber reinforced composites. Materials today: proceedings, 4(2), pp.2793-2799.
47. Kaur, T., Kumar, S., Bhat, B.H., Want, B. and Srivastava, A.K., 2015. Effect on dielectric, magnetic, optical and structural properties of Nd–Co substituted barium hexaferrite nanoparticles. Applied Physics A, 119, pp.1531-1540.
48. Patel, S., 2012. Potential of fruit and vegetable wastes as novel biosorbents: summarizing the recent studies. Reviews in Environmental Science and Bio/Technology, 11, pp.365-380.