FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION (SSTE)
P.M.B 65, MINNA, NIGER STATE, NIGERIA

10TH
SSTE HYBRID
INTERNATIONAL CONFERENCE

THEME:
EMERGING
TECHNOLOGY AND INNOVATIVE
PEDAGOGY FOR ENTREPRENEURSHIP
AND ECONOMIC DEVELOPMENT

DATE: Monday 7th to Friday 11th October, 2024.
VENUE: CPES Complex, FUT Bosso Campus, Minna, Niger State

PROCEEDINGS

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

10th

INTERNATIONAL CONFERENCE
OF SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION
(SSTE)

ISBN: 979-978-52341-0-7

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A REVIEW PAPER ON STAFF COMPETENCIES AND THE ROLE OF EMERGING TECHNOLOGIES IN LIBRARY DISASTER MANAGEMENT

Alao, R.A[1], Chuks-Ibe, P.O [2], Salau, S. A.[3], Philip Ayuba[4]
Department of Library and Information Science [2], University Library Services [3], Centre for Risk and Disaster Management [4]
Federal University of Technology, Minna[234]
Email: aloaruthadedamola@gmail.com[1]
Mobile: +2348168808696[1], +2348039695496[2], +2347068231913[3] +2348069194749[4]

Abstract
Libraries, as repositories of knowledge and cultural heritage, hold critical roles in preserving and providing access to vast knowledge resources and face various disaster threats such as fires, floods, earthquakes, and digital (cyber-attacks, data breaches) that could result in significant loss and disruption. The increasing complexity of library disaster management necessitates not only the integration of emerging technologies but also a reevaluation of staff competencies. As emerging technologies such as Artificial Intelligence (AI), Internet of Things (IoT), Blockchain and Cloud Computing reshape the landscape of disaster preparedness and recovery, library staff must possess new technical skills and competencies to manage these technologies effectively. This paper examines the critical role of staff competencies in implementing emerging technologies for library disaster management. Through a comprehensive review of recent literature (2015–2024), case studies, and real-world applications, this paper explores the interplay between staff competencies and technology, offering insights into how libraries can enhance their disaster management capabilities.

Keywords: Libraries, Disaster, Disaster management, Emerging technologies, Staff Competencies.

Introduction
The library sorts, collects, organizes, preserves, and provides an approach to knowledge and information and this makes it an indispensable unit in any institution as the case may be; It is an information center and the powerhouse of research in an institution which should be shielded from disasters (Aboyade *et al.* 2021). Libraries, being custodians of knowledge and culture, battle various disaster threats ranging from natural disasters (earthquakes, floods, cyclones) to cyber-attacks and infrastructure failures. Gajanan (2023) confirmed that disaster has a wide scope which encompasses natural and man-made which are unleashed by man either intentionally or accidentally. Ansari *et al.* (2024) affirm that disasters pose a significant threat to libraries, endangering human safety, and library assets have disorganized libraries and hinder them from providing their services. Traditionally, library disaster management has focused on physical precautions and manual interventions. However, with the advent of emerging technologies such as Artificial Intelligence, the Internet of Things, Cloud Computing, and Blockchain there is an increasing shift toward automated systems that offer advanced capabilities for the monitor, detecting, predicting risks, and responding to crisis potential disasters, but the successful application of these tools is highly dependent on the competencies of library staff. These technologies' profits cannot be maximized because it is sophisticated, therefore the role of the human factor remains crucial. Staff must be equipped with the necessary skills to handle, and interpret data, make informed decisions, and manage these technologies effectively.

Library and Academic library

Todorinova and Wilkinson (2020) define the library as a community hub for knowledge, its role not just as a repository of books but as a place for learning, collaboration, and community engagement. They looked at how libraries have evolved to include digital services, maker spaces, and event hosting to meet the needs of diverse user groups. Johnson & Colby (2021) are of the concept that an academic library is a learning and research center that meets and serves the needs of the university community. They express its transition from print-based collections to digital resources, and how academic libraries support teaching and research through access to e-resources, research consultations, and information literacy programs.

Concept Disaster

Disaster is an unforeseen happening caused by man's action, inaction, or nature that results in destruction, damage, catastrophe, and even loss of life or property (Aboyade *et al.* 2021). Disaster has been established as any sudden event that disrupts the normal functioning of an institution or community, causing widespread damage and distress. Smith (2020) affirmed that disasters can be natural, like floods and earthquakes, or man-made, such as fires, terrorism, or cyber-attacks on libraries, disasters threaten collections, digital records, facilities, and user services. Disasters threaten the preservation of physical and digital collections and disrupt the accessibility of library services (Alshammari *et al.*, 2022). Buchanan & Ahmed (2021) examine the impact of natural disasters on library collections, focusing on floods and hurricanes. They note that climate change has exacerbated the frequency and severity of these events, requiring libraries to adopt proactive measures, such as environmental monitoring systems and disaster recovery plans.

Disaster management is various coordinated processes in which disaster is being prepared for, responded to, mitigated, and recovered from which aim at reducing the risks associated with disasters and minimizing their impact when they occur. In libraries, this involves strategies for minimizing risks, ensuring the safety of personnel and collections, and restoring operations after a disaster. **Alexander (2020)** in his own opinion said that disaster management is a comprehensive process that entails **preparedness, response, recovery,** and **mitigation** activities designed to reduce the impact of natural and man-made disasters.

Emerging technologies

Emerging technologies are various advanced tools and systems that are in the early stages of usage but have significant potential to transform various industries. Artificial Intelligence (AI), Internet of Things (IoT), Blockchain (BC) and Cloud Computing (CC) are emerging technologies that offer innovative ways to detect risks, respond to incidents, and recover from damage. Despite constraints like severe operating conditions and the cost of maintenance and deployment, IoT, integrated with Web technologies and clubbed with emerging techniques like AI, machine learning, and big data analytics, provides solutions for real-time monitoring of potential disaster scenarios (Zafar *et al.,* 2019).

Rotolo *et al.* (2020) in their view states see emerging technologies as those technologies in the early stages of development but have the potential to impact society and industries significantly. They highlight the features of these technologies, such as novelty, rapid growth, and potential to disrupt established technologies and industries. Liu and Zhao (2023) affirm that these technologies are being increasingly integrated into library disaster management systems.

Staff Competencies

Staff competency includes all the library-related knowledge, skills, and abilities that a library staff acquired to enhance their effective discharge of duties and to ensure the safety of the library and its holdings. Marrelli *et al*. (2020) affirmed that staff competencies are the combination of skills, knowledge, and behaviors that employees must possess to perform their job roles effectively. They highlight the importance of competency with organizational growth and productivity, of which Kyndt *et al*. (2022) said that digital competencies are an essential component of modern staff competencies, especially in the era of digital transformation and technology. They emphasize how digital literacy, problem-solving abilities, and adaptability have become key components of competencies for employees in a technology-driven age. This can be achieved through training and retraining of library staff.

Technology proficiency is a core competency of staff in emerging technologies in library disaster management.

Kedia *et al*. (2020) in their technological point of view carried out a systematic review to identify technologies (such as Close circuit cameras- CCTV, earthquake early warning systems, smart grids, satellite imaging, drones, the internet of things, etc.) that improve situational awareness and assist decision-making across US government and domestic and international agencies during disaster-response operations of which library is not left out. Islam & Ryan (2023) highlight the importance of technological integration in disaster management. They focus on the use of artificial intelligence (AI), big data analytics, and geospatial technologies in disaster prediction, early detection, and response. They argue that technology enhances the accuracy and efficiency of disaster management efforts. The training of staff members in handling necessary equipment (both manual and those that are technology incline) in case of emergency; activities such as electrical installations, installing single switch control, periodic, termite treatment, drown operation, and digitization of library materials cannot be over-emphasized and these are done strategically to prevent disasters in the library or mitigate its effect during it occurrence (Bansal, 2015).

The introduction of IoT devices in libraries allows real-time environmental monitoring, such as temperature and humidity control, which is vital for preserving physical collections (Chen *et al.,* 2021). However, library staff must be proficient in using these devices, understanding the data generated, and making informed decisions. The ability to interpret IoT-based alerts and take preventive action is now a critical competency for modern librarians. AI can offer predictive insights into risks such as infrastructure failures or cyber threats thereby analyzing vast amounts of data and identifying patterns (Alshammari *et al.,* 2022) but library staff must possess the decision-making skills to act on these predictions because competency in using AI tools and understanding the data provided by these systems enhances the ability to prevent potential disasters.

Cloud computing technology plays of crucial role in ensuring the continuity of services after a disaster, management of cloud storage and access to backup files remotely, can enable quick recovery of digital collections (Liu & Zhao, 2023). Cloud technology management is essential to minimize downtime and ensure the accessibility of library resources even after a crisis.

Hughes (2020) stated that libraries that used blockchain-based systems were able to recover their digital records without losing any data, providing a robust solution to data security challenges. Because of the effectiveness of blockchain in preserving the integrity of digital collections following cyber-attacks. Rathore (2016) looked at emerging technologies (ETs) impact on improving performance in disaster management (DM) processes and its impact on

the performance according to the different phases of the DM cycle (preparedness, response, recovery, and mitigation) through a systematic review of the literature. Scopus, ProQuest, EBSCO, and Web of Science were used as data sources, and an initial sample of 373 scientific articles was collected, of which 69 publications were analyzed using VOSviewer software for text mining and cluster visualization. The results show that ETs foster the preparedness and resilience of specific systems when dealing with different phases of the DM cycle. Simulation and disaster risk reduction are the fields of major relevance in the application of ETs to DM, thus represent a starting point for scholars to develop future research on the topic.

Ishiwatari (2024) examined the role of drones in disaster management by analyzing various applications of drones in response to the Noto Peninsula earthquake in January 2024. Drones were used on the ground in a variety of new ways, including the transport of emergency supplies, restoration of cellphone communications, and inspection of damaged facilities. He identified several issues, such as the need to incorporate drone capabilities into disaster management plans, develop appropriate laws and regulations, establish public-private coordination mechanisms, address technological limitations due to advances in technology, and implement training programs specifically for drone operators. Collaboration among government agencies, private organizations, and industry associations in disaster. His response highlighted the importance of fostering partnerships and mobilizing collective expertise in disaster management and conclusively stated that there is an important role emerging technology (drones) can play in enhancing emergency response efforts and mitigating the impact of future disasters.

Khan *et al.,* (2020) looked at how emerging technology especially Unmanned Aerial Vehicles (UAVs) has gained significant interest in recent years, due to its wide range of applications, such as disaster management, rescue operations, military, civil, and so forth. UAVs are versatile in design and can cover larger areas, contrary to the Tethered Balloon and Loon Balloon systems. In any natural or human-made disaster, there is a high potential risk of damage to resources such as buildings, transport systems, communication systems, and basic services. UAVs prove to offer a better solution to provide fast, cost-effective, easy-to-deploy, and secure wireless communication to the victims. UAVs can be integrated with different technologies, such as the Internet of Things, Wireless Sensor Networks, Heterogeneous Networks, and Cloud computing. UAVs are most often used to fulfill both user services and requirements such as wireless communication facilities to end-users, as a relay node to extend the coverage of the core network.

Summary
Libraries face a wide range of disaster risks that threaten their collections, but emerging technologies offer powerful tools for disaster management. IoT sensors enable real-time monitoring, AI improves disaster prediction, blockchain secures digital records and cloud computing facilitates rapid recovery. To fully leverage these technologies, libraries must invest in continuous staff training to bridge competency gaps in areas like AI, IoT, and cloud computing. A holistic approach, combining emerging technologies with traditional strategies, is essential for building disaster resilience, protecting collections, and ensuring service continuity in an increasingly complex risk environment.

Conclusion
Emerging technologies are revolutionizing library disaster management, emphasizing the need for enhanced staff competencies. By utilizing AI, IoT, blockchain, and cloud computing, libraries can better prevent, mitigate, and recover from disasters, ensuring the protection of

valuable collections for future generations. To achieve this, staff must be proficient in using these technologies for tasks such as environmental monitoring, risk prediction, data security, and disaster recovery. The success of disaster management in libraries depends on a balance between adopting new technologies and continuously developing staff skills, ensuring service continuity even during crises.

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