Annotated Bibliography

Source1: Citation: Budd, J., Miller, B. S., Manning, E. M., Lampos, V., Zhuang, M., Edelstein, M & McKendry, R. A. (2020). Digital technologies in the public health response to COVID-19. Journal of Medical Internet Research, 22(11), e20135. https://www.jmir.org/2020/11/e20135/ Introduction: This study investigates the role of digital technologies in the response of public health to the COVID-19 pandemic. They reviewed the various digital tools-artificial intelligence, big data analytics, and mobile applications-applied for contact tracing, outbreak prediction, and public communication in this context. This paper discusses the advantages and challenges of integrating these technologies into healthcare systems. The results showed that digital solutions have enhanced pandemic response; however, their efficiency is ensured by data accuracy, privacy concerns, and user acceptance. Critical Evaluation: One of the strong points of this paper is that it does an extensive review of digital health interventions with empirical data and case studies to support its claims. The authors go into great detail with regard to various technologies and their practical use in pandemic management. Another strength is the discussion of ethical and privacy concerns, which are cardinal in evaluating digital interventions. However, a limiting factor to this review includes drawing heavily upon high income countries, generally more well-endowed with better digital infrastructure, and as such might omit challenges in the low-resource setting. Since its publication in 2020, some findings in this review have been outcompeted by developments in the most recent advancements regarding digital public health. Relevance: This manuscript is very relevant for my research into technology and public health in general, with a view to understand how digital tool applications can advance strategies to improve the approaches toward emergency responses. The paper thus provides a good basis on the different digital health technologies strengths and weaknesses from real-life applications. Besides, it helps discuss ethical and practical challenges in the implementation of digital interventions, something of utmost importance in shaping policy and future research in health informatics. Source 2: Smith, A., & Anderson, M. (2018). Social Media Use 2018: Demographics and Statistics. Pew Research Center. Introduction: This article examines the growing role of social media in healthcare, focusing on how both patients and professionals utilize platforms for communication, education, and support. The authors analyze various social media channels, highlighting their benefits in enhancing patient engagement and knowledge-sharing while also addressing risks such as misinformation and privacy concerns. The study provides valuable insights into the impact of digital interaction on healthcare outcomes and professional practices. Critical Evaluation: The following study shall focus on the use of social media by health professionals and patients for health communication, information-sharing, and support. The paper presents empirical

data on the effectiveness of social media in engaging patients and ethical concerns regarding misinformation and patient privacy. One of the strong points of this article is that it elaborates on various social media platforms and their contribution to shaping healthcare narratives. However, this is limited by the reliance on self-reported data, which might introduce bias in assessing the level of engagement among patients. Relevancy: This is relevant to my research because the study underlines the intersection of digital health and social media, stressing how online platforms facilitate patient education and peer support. The source provides critical views on challenges and benefits accompanying the integration of social media into health communication strategies, considering that digital health has now extended beyond the traditional use of telemedicine. Source 3: Topol, E. (2019). Deep medicine: How artificial intelligence can make healthcare human again. Basic Books. Introduction: In Deep Medicine, Topol explores the transformative role of artificial intelligence (AI) in modern healthcare. The book discusses how AI-driven technologies can enhance diagnostics, streamline medical processes, and ultimately enable physicians to focus more on patient-centered care. Through compelling case studies and expert analysis, Topol argues that AI has the potential to revolutionize medicine while addressing ethical concerns such as data privacy and algorithmic bias. Critical Evaluation: Topol's book is an argument that artificial intelligence will fundamentally change healthcare, making medical decisions better while freeing clinicians to spend more time in patient-centered care. He supports his argument with impressive evidence of what AI is accomplishing in diagnostics, predictive analytics, and precision medicine. The strength of the book is in its well balanced approach to viewing both the revolutionary possibilities with AI, as well as ethical concerns pertaining to data privacy and algorithmic bias. A weakness is that many of the case studies pertain to potential, not actual, uses that are implemented today, hence reducing practical applicability immediately. Relevancy: This source is highly relevant because it addresses how AI-driven innovations integrate with digital health technologies to enhance healthcare delivery. It supports my research by giving insight into the evolving role of AI in patient care, supporting my analysis of the impact of digital tools on healthcare professionals and patients.

INTRODUCTION

Artificial Intelligence (AI) is transforming the healthcare industry by enhancing diagnostic accuracy, streamlining treatment processes, and improving patient outcomes. AI-powered tools, such as machine learning algorithms and predictive analytics, enable faster disease detection, personalized medicine, and optimized hospital workflows. Eric Topol's *Deep Medicine* highlights AI's potential to restore the human element in healthcare by reducing administrative burdens, allowing physicians to spend more time with patients. AI-driven diagnostic tools, including deep learning applications in medical imaging and natural

language processing in electronic health records, have demonstrated significant improvements in efficiency and accuracy. However, despite its numerous advantages, AI integration in healthcare comes with ethical, financial, and regulatory challenges. Data privacy remains a critical concern as AI systems rely on large datasets, raising issues regarding patient confidentiality and cybersecurity risks. Algorithmic bias presents another challenge, as AI models trained on non-representative data can lead to disparities in healthcare outcomes, disproportionately affecting marginalized communities. Moreover, the high cost of AI implementation limits accessibility, particularly in low-resource settings, further widening the gap in healthcare equity. While AI has the potential to address these disparities through telemedicine and remote diagnostics, its widespread adoption is hindered by regulatory uncertainties and resistance from healthcare professionals who fear job displacement and lack trust in AI-driven recommendations. The success of AI in healthcare depends on addressing these concerns while ensuring responsible and transparent integration. This study aims to explore AI's role in improving diagnostic accuracy, reducing physician workload, and increasing healthcare accessibility, while also examining the ethical and regulatory challenges that accompany its implementation. By evaluating both the benefits and limitations of AI in healthcare, this research seeks to identify strategies for leveraging AI to enhance medical care while mitigating risks associated with bias, privacy, and affordability.

RESEARCH QUESTION:

1. How can AI-driven diagnostic tools improve healthcare accuracy while minimizing biases and ensuring ethical implementation?

Methodology

Participants

The participants in this study were 35 undergraduate students enrolled in a second-year data analytics course at a large Midwestern university. Participants ranged in age from 19 to 23 and came from a variety of academic majors including business, engineering, and computer science. A convenience sampling method was used, as all students were currently enrolled in the course during the Spring 2025 semester. Participation in the study was voluntary and did not impact students' grades.

Materials and Instruments

Data were gathered using a structured online survey administered through Qualtrics. The survey consisted of 20 questions, including Likert-scale, multiple-choice, and short-answer items. Questions focused on students' prior experience with analytics tools, perceived learning outcomes, and preferences for instructional formats (e.g., in-person, hybrid, online). The survey

instrument was reviewed by two faculty members in the Information Systems department to ensure clarity and relevance to the course objectives. Microsoft Excel and SPSS were used for data management and analysis.

Procedure

The study took place during weeks 7–8 of the Spring 2025 semester. An invitation to participate in the study, along with a consent form, was emailed to students using the university's learning management system. Students were instructed to complete the survey within one week. No identifying information was collected, and survey responses were stored securely on the university's cloud system. Completion of the survey took approximately 10–15 minutes.

Ethical Considerations

All participants provided informed consent before beginning the survey. Participation was entirely voluntary, and students were informed that their responses would remain anonymous and confidential. No academic or personal identifiers were linked to the data. The study was approved by the university's Institutional Review Board (IRB), and all procedures adhered to ethical research standards.

Data Analysis

Quantitative responses were analyzed using SPSS software. Descriptive statistics such as means, standard deviations, and frequency distributions were calculated to summarize responses. For open-ended questions, thematic analysis was conducted by identifying common keywords and grouping responses into relevant categories. The results were then interpreted to draw connections between students' background experiences and their engagement with the course content.

References:

1. Budd, J., Miller, B. S., Manning, E. M., Lampos, V., Zhuang, M., Edelstein, M & McKendry, R. A. (2020). Digital technologies in the public health response to COVID-19. Journal of Medical Internet Research, 22(11), e20135. https://www.jmir.org/2020/11/e20135/
2. Smith, A., & Anderson, M. (2018). Social Media Use 2018: Demographics and Statistics. Pew Research Center.
3. Topol, E. (2019). Deep medicine: How artificial intelligence can make healthcare human again. Basic Books.