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Obtaining and Using Data for Decision Support and Innovation in Resource-Constrained Environments

We live in an increasingly data-driven world, and as academics, researchers and professionals, we need the ability to manage, analyze, and interpret data efficiently. We also need to know how to source data and get around the various red-tape systems that are even more prevalent in resource-limited contexts, such as in Africa. This presentation reflects on over a decade of research and practical experience in harnessing data for decision-making in education, healthcare, and public administration, particularly within the context of Botswana.

One key area of focus has been optimizing data management processes to enhance operational efficiency and accuracy. My work on Data Matching has tackled a number of practical problems, including a project which showcases the potential of intelligent data matching techniques to streamline administrative tasks, prevent errors, and ultimately improve the quality of educational outcomes, by matching student registration records with exam scripts.

In healthcare, data-driven decision support systems have proven invaluable. My work on expert systems for HIV and AIDS Information and development of Decision Support for Provision of HIV Treatments has demonstrated the role of expert systems and artificial intelligence in improving treatment outcomes for complex diseases such as HIV/AIDS. This was extended further with a project which analyzed drug resistance in HIV/AIDS patients using clustering, which leverages AI to address drug resistance challenges in public health.

The integration of traditional knowledge systems with modern data technologies is another emerging area of interest. The study on Patient Management and Health Outcome Monitoring by Traditional Healers in Botswana provides a unique perspective on how data from non-conventional healthcare systems can be incorporated into formal health monitoring frameworks.

The COVID-19 pandemic underscored the importance of adaptable and scalable data management systems. In my publication on Experiences, Lessons, and Challenges With Adapting REDCap for COVID-19 Laboratory Data Management in a Resource-Limited Country, we explored the adoption of a research data platform to manage critical health data, highlighting the adaptability of digital tools in crisis situations.

Building on this, I am currently leading a project that focuses on predicting COVID-19 mortality in Botswana using machine learning models. By leveraging high-dimensional clinical datasets, which include both structured clinical parameters and unstructured textual data, our models aim to provide early and accurate predictions of patient outcomes. This project illustrates the power of machine learning in enhancing healthcare systems' ability to proactively manage pandemic-related challenges. The insights gained from this work not only inform clinical interventions but also help optimize resource allocation in healthcare, a critical need in resource-constrained environments like Botswana.

Through this presentation, I will synthesize these experiences to explore how data can drive innovation, improve decision-making, and overcome challenges in resource-constrained environments. The talk will also offer insights into future opportunities for data utilization in sectors ranging from education to healthcare, with a focus on low-resource settings, as well as experiences on hurdles to obtaining data for research and recommendations for better policies related to data management, sharing, and protection.

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