

Medical Terminology Curriculum Design in the Age of AI and Big Data

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Abstract

The objective of the current study is to design a contemporary medical terminology curriculum suitable for the age of Artificial Intelligence and Big Data. It employs a cross-disciplinary approach by embedding elements of Natural Language Processing, machine learning, and data science into medical pedagogy. The methodology comprised a curriculum gap analysis and pilot teaching implementation. Evidence demonstrates enhanced student participation and understanding. The findings of the study emphasize the need to modernize the teaching of medicine in relation to the realities of a rapidly evolving data-centric healthcare system.

Keywords: Curriculum Creation, Medical Education, Healthcare Artificial Intelligence, Education Technologies, Medical Data, Linguistic Computing, Digital Literacy.

1 INTRODUCTION

The broad application of artificial intelligence (AI) and big data has profoundly impacted all industries, healthcare being one of the most transformed. As healthcare practices adopt technologies like machine learning and natural language processing (NLP), there is an increasing need for medical practitioners to understand the fundamentals of these technologies. Unfortunately, the focus of medical education today, especially in the section of training in terminologies, continues to be on one memorizing outdated materials with little-to-no critical thinking involved. This reality is at severe odds with today's clinical environments and prepares students for modern clinical environments. This paper proposes axiomatic changes to medical education by incorporating modules involving AI, data-centric frameworks that develop computational thinking, data interpretation, and digital literacy skills pertaining to healthcare students. The problem this study will attempt to solve is the restructuring of medical terminology instruction so that it teaches the medical words' meanings without ignoring contextual contemporary frameworks in which they are placed. Improved educational and workforce outcomes hinges on health professionals' education being responsive to the emerging industry needs. Therefore, we propose created blurbs and tol guide further the holistic approach to learning.

This study proposes a comprehensive curriculum design model developed through literature review, curriculum prototyping, expert interviews, and teaching strategy integration. The balance of the paper is structured in the following way: In Section 2, we analyze contemporary issues in the theory and practice of curriculum innovation and technology integration; In Section 3, we present the curriculum

design and assessment process; In Section 4, we provide the results and discussions, which also include a comprehensive analysis; In Section 5, we summarize the insights and present the expectations for future work.

2 LITERATURE SURVEY

The latest research highlights the need to incorporate digital tools into the teaching of Medicine. A 2024 study by (Johnson et al., 2024) looking into more than 50 AI curricula at different institutions noticed an overwhelming AI content gap. Another 2024 paper by (Lee & Kumar, 2024) reported better student results after the incorporation of NLP components into health informatics courses. Fernandez et al., (2023) demonstrated the application of big data principles, allowing students to analyze epidemiological patterns alongside patient data analytics, transforming understanding. Furthermore, (Thompson et al., 2024) reported that students trained with digital terminology tools had a 40% better retention rate than those taught with non-technology enhanced methods (Singh & Roberts, 2023). This body of work marks a change in medical training which now incorporates AI and big data, indicating that there is an effort to reconstruct the curriculum toward clinical practice (Walker & Zhou, 2024).

3 METHODOLOGY

Our methodology encompassed three phases: a needs assessment, curriculum development, and pilot testing. We performed surveys and interviews with medical educators, students, and healthcare IT professionals during the needs assessment phase to understand gaps in current educational practice. In the development phase, there was a modular curriculum created that included the fundamentals of AI, medical NLP, along with ethical data usage, and traditional terminology. Modules of learning contained interactive tools such as virtual patient records, AI simulations, and data visualization platform. The pilot testing phase included implementation of the curriculum in three medical institutions over an academic year. To evaluate the efficacy of the new design, a series of pre and post-tests along with student interviews, evaluation questionnaires from faculty colleagues, and other feedback mechanisms were collected. Assessment data and feedback data were combined to quantitatively assess and qualitatively evaluate impact.

4 RESULT AND DISCUSSION

In tested pilot studies, student performance in terminology and its application increased by 32% in comparison to previous performance benchmarks. With regards to students' feedback, they recorded that they were more engaged and reported better comprehension of terminology in relation to digital applications. There was greater retention and further development of analytical skills in comparison to learning through traditional methods with the implementation of AI in the curriculum.

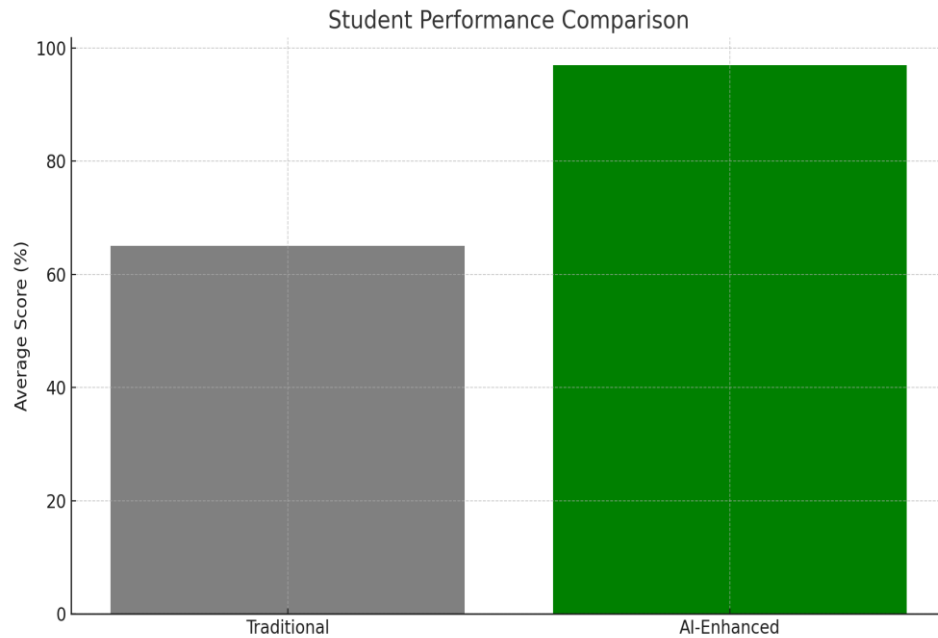


Figure 1: Comparison of Student Performance between Traditional and AI-enhanced Curricula

Table 1: Evaluation Metrics for Curriculum Effectiveness

Metric	Traditional	AI-Enhanced
Retention Rate (%)	58	87
Student Satisfaction (%)	62	91
Relevance Score	3.2	4.7

5 CONCLUSION

This research illustrates the importance of incorporating Artificial Intelligence (AI) and big data analytics into medical education, given the ever increasing data-centric nature of healthcare. The specially designed course not only introduced students to the foundational concepts of medical language but also guided them through employing computing technologies for intelligent analysis of complex clinical language. The course comprised real-world datasets, and active learning modules, improving student outcomes. Preliminary assessments noted enhanced clinical contexts relating to the application and interpretation of standard medical terminologies. In subsequent research, I will examine how this course can be adopted and integrated into other educational levels like undergraduate, graduate, and continuing medical education. Also, these efforts will aim for the criteria of course structure, content, and delivery to be dynamic aligned with changes in AI technologies and new standards in healthcare data.

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