Evaluating an Immersive Curriculum in Innovation and Health Systems Science

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INTRODUCTION AND OBJECTIVES

Rapid changes in technology and scientific advancement is creating significant shifts in healthcare systems. There is a lack of an Undergraduate Medical Education (UME) curriculum to equip future physicians with the skills needed to develop innovative solutions to improve the delivery and advocacy for patient healthcare. Our question: can the introduction of foundational innovative concepts methods and tools increase student confidence to create innovative solutions for Health Systems Science.

OBJECTIVES

- To describe the implementation of a novel longitudinal, immersive curriculum for Innovation and Health Systems Science
- To evaluate the changes in perceived confidence and value by medical students over time

METHODS AND DESIGN

This is an observational, prospective cohort study design. Participants are students enrolled in the Texas College of Osteopathic Medicine, classes of 2024 and 2025. The course is designed to provide students with foundational concepts, methods and tools for innovation adapted from meta cognitive, Master Adaptive Learner, and self-efficacy and innovation concepts. The course intervention is experiential and immersive. Course Design Includes:

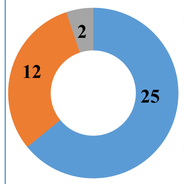
Foundational Innovation concepts with targeted exercises

- **Teaching intervention**
- **Experiential exercise and presentation**
- **Review by experts and mentors**

Post-Intervention reflection on osteopathic professional identity, confidence, and interest for creating innovation.

Pre-Intervention reflection on osteopathic professional identity, confidence, and interest for creating innovation and change. Students are required to review health systems science concepts.

Survey items were segmented three main outcomes domains.



- **Level of confidence in addressing challenges as a health care professional/provider (25 items)**
- **Personality characteristics that they perceived as important for career success (12 items)**
- **Their level of interest in creating innovation and change in Health Systems (2 Items)**

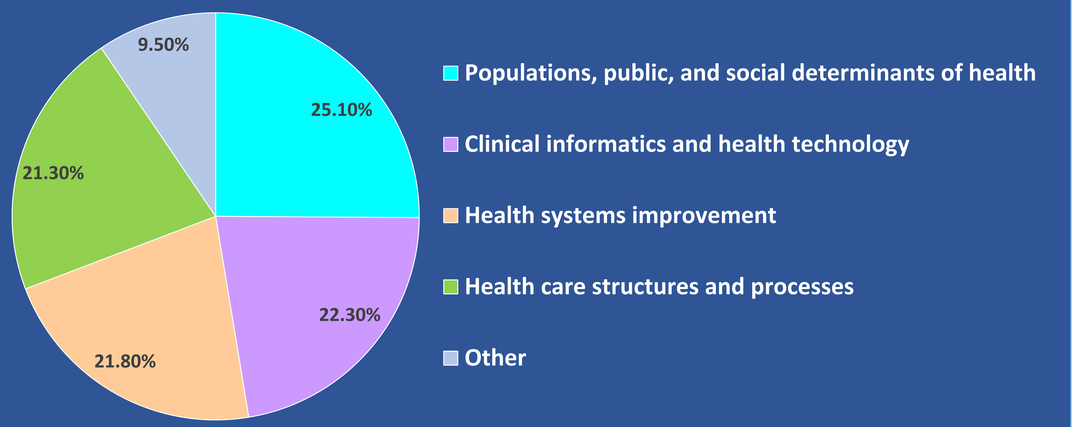
*All outcomes were measured on a five-point Likert scale, higher scores indicated perceived higher confidence, higher value, or higher interest.

STATISTICAL ANALYSIS

Descriptive statistics using means and standard deviation, or medians and interquartile range were performed to summarize results from the survey scores per item. Frequencies and percentages were used to summarize the proportion of students' selection per HSS area. Wilcoxon signed-rank test was used to compare the changes in perceptions from the pre and post surveys.

Foundational Innovation concepts, methods and tools can help medical students increase their confidence and perceived value of areas important to create innovative solutions in health systems.

Top areas of interest for Medical students to innovate in Health Systems Science (HSS)



As the students finish their proposal with the help of experts in the field, more information will be available about the HSS areas that had the most success, in addition to the association between initial perceptions or personality traits and the successful completion of the proposal.

RESULTS

A total of 234 students, class of 2025, completed the pre and post surveys (100% response rate).

In the confidence domain, the lowest five scoring items of the pre-course survey included **discovering new ways to improve health care, creating a vision to improve healthcare, identifying new markets and customers, finding a HSS topic that they are passionate about, and pitching themselves to an attending that wants to learn more about them.** In all five items, median scores have increased from 3.0 (IQR: 3.0-4.0) to 4.0 (IQR:4.0-5.0), with a p<0.0001.

Personal Characteristics	Pre mean (SD)	Post mean (SD)	P value
Innovative mindset	3.9 (.94)	4.3 (.83)	<.0001
Problem solver	4.3 (.76)	4.5 (.71)	0.006
Reflective listener	4.5 (.69)	4.6 (.61)	0.009
Lifelong learner	4.5 (.62)	4.7 (.61)	0.014
Growth	4.6 (.63)	4.7 (.58)	0.085
Teams	4.4 (.75)	4.5 (.65)	0.094
Collaboration	4.5 (.71)	4.6 (.62)	0.137
Self-motivation	4.5 (.59)	4.6 (.58)	0.148
Persistence	4.6 (.61)	4.7 (.56)	0.167

LIMITATIONS

These are the results from only the first year of a 4-year longitudinal curriculum, changes over multiple years will give a better insight about the value of the course. Also, qualitative results from open-ended questions and reflections were not included in the results.

REFERENCES

1. Cooke MC, Irby DM, O'Brien BC, et al. Educating physicians: a call for reform of medical school and residency. San Francisco (CA): Wiley; 2010.

2.Frenk J, Chen L, Bhutta ZA, et al. Health professionals for a new century: transforming education to strengthen health systems in an interdependent world. Lancet. 2010;376(9756):1923–7.

3.Teaching new content in health systems science [Internet]. American Medical Association; c1995-2017 [cited 2022 October 4]. Available from: https://www.ama-assn.org/education/teaching-new-content-health-systems-science.

4.Core entrustable professional activities for entering residency: curriculum developers' guide [Internet]. Association of American Medical Colleges; 2014 [cited 2017 Feb 4]. Available from: https://members.aamc.org/eweb/upload/core%20EPA%20Curriculum%20Dev%20Guide.pdf.

5.Blake A Niccum, Arnab Sarker, Stephen J Wolf & Matthew J Trowbridge (2017) Innovation and entrepreneurship programs in US medical education: a landscape review and thematic analysis, Medical Education Online, 22:1, DOI: 10.1080/10872981.2017.136072 2

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