THE ROLE OF THE MEDICAL HUMANITIES AND TECHNOLOGIES IN 21ST-CENTURY UNDERGRADUATE MEDICAL EDUCATION CURRICULUM

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Elizabeth A. Fehsenfeld

Drew University

Madison, New Jersey

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ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

ABSTRACT

The Role of the Medical Humanities and Technologies in the 21st Century Undergraduate Medical Education Curriculum

Doctor of Medical Humanities Dissertation by

Elizabeth A. Fehsenfeld

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The organization of medical school curriculum must change. Reports by Cooke et al. and the Josiah Macy Jr. Foundation, calling for the structure of medical school curriculum to change, were published in 2010. The reports called for social and cultural awareness in education, the need to focus on student-centered learning, and the use of technology in courses, and cautioned against the rising costs of medical school. Innovators in medical school curriculum are embracing how technology and medical humanities together can serve to address the issues raised in the two reports. However, these innovations have been limited in implementation to a small number of schools and have yet to become part of the standardized medical school curriculum to prepare the next generation of healthcare professionals. This dissertation is a comparative case study of three medical schools that have changed or are in the process of changing their curriculum. Specifically, this dissertation looks at the mechanisms innovative medical schools use to incorporate the reports' recommendations, by employing aspects of medical humanities and technology in the curriculum, and how these mechanisms can be implemented more broadly into other medical colleges. Findings include focusing on the

future by supporting staff and faculty development to support their scholarship and working with them to change their teaching style.

DEDICATION

This dissertation is dedicated to

my parents, John R. and Joan M. Fehsenfeld,

two life-long educators who believe that education is broadening.

I thank my parents and my sister,

Lisa M. Fehsenfeld,

for sharing the gift of reading and the love of exploring and discovering

and never-ending questioning.

CONTENTS

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Chapter 1

CURRICULUM REFORM IN UNDERGRADUATE MEDICAL EDUCATION: THE ROLE OF THE HUMANITIES AND TECHNOLOGY

This chapter serves as an introduction to undergraduate medical education reform. It explains why curriculum reform movements are underway, the response to the call for reform, and the exploration of the integration of the humanities and technology into the curriculum. The curriculum reform stems from calls for increasing student-centeredness and engagement in learning while expanding students' perceptions of social and cultural determinants in regard to obtaining and following medical care. There are three sections in this chapter describing: a) why curriculum reform is underway in undergraduate medical education, b) the response to the call for reform; and c) the exploration of the integration of medical humanities and technology into curriculum reform at three medical schools.

The Call and Recognition of the Need for Reform

Rapid advances in medicine and treatment options in terms of information attainment and training opportunities have occurred due to the technological revolution. Professional fields outside of medicine have quickly adapted and embraced the changes available due to the technological revolution. Medical education has been slow to assimilate the changes for several reasons. Medical education has been built and upon a hundred-year-old structure. In 1910 Abraham Flexner was hired by the Carnegie Foundation to look at the state of medical education and make recommendations. Essentially the findings called for medical schools to be associated with a university and

to offer two years of science education followed by two years of clinical experience. Those recommendations were approved and adopted by the American Medical Association (AMA) and embraced by every current medical school and medical accreditation organization. Thus any change made to the structure of medical education must gain approval from internal and external agencies. Samuel Bloom in his 1988 article "Structure and Ideology in Medical Education: An Analysis of Resistance to Change" illustrates how the model of two years of science and two years of clinical, called 2+2, has received calls to adapt to new resources that have evolved in the last fifty years.[1] This dissertation examines the connection between medical schools using an organizational change model that focuses focusing on integrating medical humanities with the latest technological tools, to create a sustainable model for medical education.

Flexner II

Two significant reports, funded by the Carnegie Foundation and Josiah Macy Jr. Foundation, calling for change in the structure of medical school curriculum were published in 2010.[2] The new Carnegie Report, often referred to as Flexner II or the Cooke Report, calls for social and cultural awareness in education, the need to focus on student-centered learning, using technology in courses, and cautioned against the rising

[1] Samuel Bloom, "Structure and Ideology in Medical Education: An Analysis of Resistance to Change," *Journal of Health and Social Behavior* 29, no. 4 (Dec. 1988): 294-306, accessed Dec. 1, 2006, http://links.jstor.org/sici?sici=0022-1465%28198812%2929%3A4%3C294%3ASAIIME%3E2.0.CO%3B2-B.

[2] Molly Cooke, David M. Irby, and Bridget O'Brien, *Educating Physicians: A Call for Reform of Medical School and Residency* (San Francisco, CA: Jossey-Bass, 2010); Josiah Macy Jr. Foundation, *Ensuring an Effective Physician Workforce the United States: Recommendations for Reforming Graduate Medical Education to Meet the Needs of the Public*, 2011, accessed Apr. 26, 2015, http://macyfoundation.org/docs/macy_pubs/JMF_GME_Conference2_Monograph%282%29.pdf.

costs of medical school. The Cooke and Macy Reports address several current issues in medical education that need to be addressed to sustain medical education for future generations.

To adapt the recommendations, one must first realize the reports call for a transformation in how medicine is taught. Modifying the curriculum will result in some form of organizational and cultural change. Looking at the process from a medical school dean's perspective provides the scope for how many elements are required to transform the curriculum. Understanding what steps are required in the leadership of higher educational organizations is different than in other organizations but remains a key element of providing direction. Robert Birnbaum, former president of the Association for the Study of Higher Education, writes, "The relationships between the leadership and the constituent groups are not necessarily hierarchical or hegemonic."[3] Medical colleges mimic other higher education systems, as many leaders emerge among peers, thus presenting challenges regarding one's management style. Understanding how curriculum deans in medical schools are working through expected and necessary alterations will help to highlight the mechanism serving as a change agent.

The various ways in which medicine is delivered require altering how medicine is taught. This study looks at what organizational change methods medical colleges are using to transform curriculum. The Dean of Dartmouth's Geisel School of Medicine in 2012 used an organizational change to guide faculty through the process of redesigning

[3] Birnbaum, Robert, "Introduction" in *Organization & Governance in Higher Education*, ed. M. Christopher Brown. Boston, MA: Pearson Custom Pub, 2000.

the curriculum.[4] The desire to change and the authority to act traditionally originates from the top leadership, but requires the understanding and buy-in from faculty and staff at all levels. The model of medical education was defined a hundred years ago with the Flexner Report; the Cooke and Macy Reports issued in 2010 provide a strategy for adapting to new concerns in this millennium.[5]

The necessary transformation of medical curriculum suggested in the Cooke and Josiah Macy Reports requires thinking outside of the box, as changes are needed to meet the recommendations. An organizational change model provides a template to follow and allows for a critical review of how a medical school's curriculum and student attendance falls against set benchmarks and perceptions. Viewing the curriculum through a medical humanities lens provides access across the spectrum to understand how humanities can be re-introduced into course content, or strengthen existing content to keep the focus on treating the patient, not the symptoms.

Aligning the curriculum change process with organizational change framework helps to create an understanding of the change mechanism required to change the curriculum based on Cooke's and Macy's reports. The sustainability factor will be based on student-centered learning components, students embracing and understanding the importance of the Physician/Patient Relationship (PPR) and importance of understanding social and cultural aspects of treating patients. The change in curriculum also focuses on

[4] "Geisel School of Medicine at Dartmouth Writes About Changing Its Curriculum in Light of the Cooke Report," Geisel School of Medicine, accessed Jan. 10, 2014, http://geiselmed.dartmouth.edu/insider/curriculum-redesign/learnmore/Institutional_Change.

[5] Abraham Flexner and Daniel Berkeley Updike. *Medical Education in the United States and Canada: A Report to the Carnegie Foundation for the Advancement of Teaching* (New York, 1910).

assisting medial students becoming physicians who are comfortable interacting with patients and healthcare teams.

Pre-Med Requirements

There are four groups responsible for the oversight of medical college curriculum. The groups are: the Committee on Medical Education (LCME) that governs medical school curriculum; The United States Medical Licensing Exams (USMLE) given by the National Board of Medical Examiners (NBME); The Medical College Admissions Test (MCAT), a program of the Association of American Medical Colleges (AAMC); and the Accreditation Council for Graduate Medical Education (ACGME).[6] The LCME works in concert with its sponsors "the Association of American Medical Colleges (AAMC) and the Council on Medical Education of the American Medical Association (AMA)."[7]

In 2014, the LCME published revised standards for implementation beginning July 2015.[8] The new standards will be reviewed when medical schools go through the re-accreditation process.[9] There are twelve standards. Each standard has objectives that spell

[6] The LCME is recognized by the U.S. Department of Education as an accrediting agency for medical education programs leading to the MD degree. For simplicity, the LCME website contains references to "schools" instead of "medical education programs leading to the MD degree." Though references on the LCME website to "schools" are synonymous with "medical education programs," the distinction between programmatic accreditation vs. institutional accreditation is an important one. Institutional accreditation is granted by regional accrediting agencies and is required to qualify for federal financial assistance programs authorized under Title IV of the Higher Education Act. "About the Liaison Committee on Medical Education," Liaison Committee on Medical Education, 2015, accessed Apr. 26, 2015, http://www.lcme.org/about.htm.

[7] "About the Liaison Committee on Medical Education."

[8] "Functions and Structure of a Medical School: Standards for Accreditation of Medical Education Programs Leading to the M.D. Degree," Liaison Committee on Medical Education, accessed Mar. 2014, http://www.lcme.org/publications/functions2013june.pdf

[9] "To achieve and maintain accreditation, a medical education program leading to the M.D. degree in the U.S. must meet the standards contained in this document. The accreditation process requires a medical education program to provide assurances that its graduates exhibit general professional

out how medical schools may meet the standard. There are twenty-three objectives medical schools need to incorporate into the undergraduate medical experience in regard to classroom, clinical, and socio-environmental aspects of health. Many of the criteria align with recommendations made in the 2010 Carnegie and Josiah Macy Jr. Foundations as well as the Institute of Medicine reports.[10] Examples of the educational objectives include:

> Standard 6: Competencies, Curricular Objectives, and Curriculum Design: 6.3: The faculty of a medical school ensure that the medical curriculum includes self-directed learning experiences and time for independent study to allow medical students to develop the skills of lifelong learning. Self-directed learning involves medical students' self-assessment of learning needs; independent identification, analysis, and synthesis of relevant information; and appraisal of the credibility of information sources.
> Standard 7: Curricular Content. 7.9: The core curriculum of a medical education program must prepare medical students to function collaboratively on health care teams that include health professionals from other disciplines as they provide coordinated services to patients. These curricular experiences include practitioners and/or students from other health professions.[11]

These specific criteria recognize the delivery of healthcare and expectations of what is included in the care has change and will continue to change. Thus, these new standards help medical schools create opportunities for their students.

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competencies that are appropriate for entry to the next stage of their training and that serve as the foundation for lifelong learning and proficient medical care." "Functions and Structure of a Medical School," iv.

[10] Cooke, Irby, and O'Brien; Institute of Medicine and Committee on Planning a Continuing Health Care Professional Education Institute; Board on Health care Services, *Redesigning continuing education in the health professions*, Washington, DC: National Academies Press, 2010, accessed Apr. 26, 2015, http://www.nap.edu/catalog.php?record_id=12704; "Preparing Health Professionals for a Changing Healthcare System," The Josiah Macy Jr. Foundation, 2010, accessed Apr. 26, 2015, http://macyfoundation.org/publications/publication/2010-annual-report-preparing-health-professionals-for-a-changing-healthcare.

[11] "Preparing Health Professionals for a Changing Healthcare System," 9 and 13.

The national test required by medical colleges is the MCAT. A revised MCAT will begin to be given in the spring of 2015. The redesign took into account the changes in how medicine is practiced.[12] The 2015 version "shifts the focus from testing what applicants know to testing how well they use what they know. It recognizes the most recent medical advances and changes in our health care system by emphasizing scientific reasoning, research design, and data interpretation skills. It adds a new section that acknowledges the need for tomorrow's physicians to understand how behavior interacts with biological factors to influence health outcomes and how social inequities impact a patient's health."[13] Some medical schools have been changing admissions requirements to include social and cultural awareness aspects. The changes in the MCAT begin to open the door for more curriculum changes within the medical school setting to meet students' and accrediting agencies' expectations. In an open letter to students considering medical school, discussing the changes in the MCAT, the president of the AAMC wrote:

> Thinking about the rapid increases in medical knowledge brings me to another feature of the 2015 exam: the new "Critical Analysis and Reasoning Skills" section, which is designed to help medical schools assess how you think by asking you to analyze passages from a wide range of disciplines, including ethics, philosophy, cultural studies, and even population health. No longer is it humanly possible to memorize every fact relevant to the practice of medicine. What is more important for physicians of the future is an ability to think critically and to have the necessary reasoning skills to

[12] "Teaching cognitive–behavioral intervention to students without a background in learning theory is analogous to teaching pathophysiology to students who have not been exposed to basic biologic principles. The MCAT committee and the AAMC recognized that future physicians need better, standardized training in behavioral and social sciences before and during medical school." Robert M. Kaplan, Jason M. Satterfield, and Raynard S. Kington, "Building a Better Physician—the Case for the New MCAT." *The New England Journal of Medicine* 366, no. 14 (2012): 1265-68, http://www.nejm.org/doi/full/10.1056/NEJMp1113274.

[13] "Innovations in Medical Education," Association of American Medical Colleges, accessed Apr. 26, 2015, https://www.aamc.org/download/397968/data/0072014r.pdf.

know where to seek answers and how to solve problems in the clinical environment.[14]

This shift in the MCAT represents how medical colleges recognize their student makeup has to change to accept students who have a humanities background.[15] The MCAT changes further support the work of individual medical schools that have expanded their applicant pool by looking for students with skill sets beyond the hard sciences.

Core Competencies in Graduate Medical Education

The ACGME is responsible for residency programs in the United States. According to its website it is "responsible for the accreditation of about 9,500 residency education programs. Residency education is the period of clinical education in a medical specialty that follows graduation from medical school, and prepares physicians for the independent practice of medicine."[16] The ACGME works with medical educators as well as physicians to support the education of physicians. Recent examples of modifications to residency education have been the restriction on the number of hours residents can work in one shift. The reduction of hours was in response to the call to reduce medical errors. Technically, the ACGME could pull a medical sites accreditation if residents work longer

[14] Kirch, Darrell G. "A Word From the President: MCAT2015: An Open Letter to Pre-Med Students," *AAMC Reporter*, March 2012, Association of American Medical Colleges, accessed Apr. 26, 2015, https://www.aamc.org/newsroom/reporter/march2012/276772/word.html.

[15] **10.1 Premedical Education/Required Coursework:** Through its requirements for admission, a medical school encourages potential applicants to the medical education program to acquire a broad undergraduate education that includes the study of the humanities, natural sciences, and social sciences, and confines its specific premedical course requirements to those deemed essential preparation for successful completion of its medical curriculum. "Functions and Structure of a Medical School, 18.

[16] "About ACGME," Accreditation Council for Graduate Medical Education, accessed Apr. 26, 2015, http://www.acgme.org/acgmeweb/tabid/116/About.aspx.

than the accepted norm. "The ACGME accredits residency programs in 140 specialty and subspecialty areas of medicine, including all programs leading to primary Board certification by the 24 member boards of the American Board of Medical Specialties."[17]

The ACGME has actively engaged in recognizing that graduate medical education also has to change in accordance with undergraduate medical education. The 2010 Carnegie Report cites specific ways graduate education can reform. It is mentioned here to show that change for both undergraduate and graduate education is parallel. While noted here, the graduate curriculum reform efforts are beyond the scope of this study.

Responding to the call for reform

There are several ways to address the calls to reform medical education. Two resolutions offered in this study are 1) the incorporation of humanities into medical education to teach medicine as well as 2) the use of technology to re-envision the curriculum.

The Role and Impact of the Medical Humanities

As scientific advancements increased in the last century, medical education embraced science education; this empirical emphasis slowly eclipsed teaching through the humanities. The ability to problem-solve, consider non-conventional options, as well as to talk with patients, pick up on non-verbal clues, and manage aspects of illness requires many skills taught through the humanities, thus evoking the term "the art of medicine." Managing illness includes the biological implications of the disease along

[17] "About ACGME."

with any lifestyle changes to live with the disease or chronic health condition. Teaching how to become comfortable talking with patients, especially how to discuss one's prognosis with a patient, is one example of how to incorporate social and cultural awareness aspects recommended in the Cooke and Macy Reports. Medical schools with curricula that incorporate the concept of illness experiences and how to help patients manage their chronic health recognize how the definition of medicine continues to evolve.

At the same time, patients may access an incredible amount of information regarding their diagnosis, but the aspect of comprehending and understanding still needs to occur. Thus the ability to talk with patients remains a critical core function of the PPR. The PPR remains at the core of the practice of medicine. The mechanisms for teaching and modeling the PPR traditionally are not taught until the third or fourth year of medical school. Some medical schools are changing the model to introduce first-year students to patients immediately. The mechanisms to change the format are relevant to this dissertation as it plays a role in adapting curriculum.

The Role and Impact of Information and Communication Technologies

Cooke's and Macy's reports call not only for cultural change in how medical colleges operate but also to include an expanded notion of social and cultural awareness to engage the expansive invention of technology to teach, monitor, and improve the delivery of medical care. The idea of using the latest technology to teach as well as to treat requires the ability to remain adaptive. Eric Topol, Chief Health Officer at Scripps Translational Science Institute, points out, technological tools continue to expand and

affect how care will be delivered in multiple formats: the appointments in the traditional doctor's office, questions asked and answered via email and video-conference, the real-time monitoring of patients via telemedicine.[18]

Thus the definition of how or where the practice of medicine occurs is no longer confined, and many medical schools are only beginning to change how they are teaching to accommodate these realities. Additionally, while many medical colleges are utilizing aspects of technology to teach and monitor skill-sets, the expense of equipment and of training staff have been prohibitive in revolutionizing the entire curriculum to respond to recommendations in the reports. Aspects of the curriculum have been updated, but the sequence and structure of what is taught and how it is taught require energy and leadership in the context of structural change. Professors are teaching materials in similar formats to how they learned the material. Even while staying current with new updates in their fields, bringing new methods of teaching material has been dependent upon a professor's willingness to adapt. Students are not engaging in the classroom, as they are used to being taught in different styles than large lecture formats. Student-centered learning may reduce student burnout as it provides context and ways to engage.[19] Reconfiguring what constitutes the classroom space has also added to the expense of transitioning curriculum.

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[18] Eric Topol, *The Creative Destruction of Medicine: How the Digital Revolution Will Create Better Health Care* (New York: Basic Books, 2012).

[19] M. L. Jennings, "Medical Student Burnout: Interdisciplinary Exploration and Analysis," *Journal of Medical Humanities* 30, no. 4 (2009): 253-69, accessed Sept. 14, 2014, *Academic Search Premier*, EBSCO*host* (accessed September 14, 2014).

Exploration of the Integration of the Medical Humanities and Technology in the 21st-Century Curriculum: An Examination of Curriculum Reform in 3 Medical Schools

The ideal outcome of the curriculum changes will produce a physician who has critical thinking skills, is comfortable with the ambivalence of not having concrete answers to offer a diagnosis, and embodies the characteristics of humanism in medicine. In a commentary in *Medical Education* three medical educators suggest: "Expanding our view of the skill set required by the 21st century doctor opens up a wide range of previously unidentified or unexplored opportunities. These experiences need not occur just in the context of one doctor and one patient, but also with populations of patients and the healthcare system as a whole."[20] The ability to take the time with the patient in identifying the cause and working to find a solution requires the ability to problem-solve. Critical thinking and observation skills also heighten the awareness of the physician/patient relationship and what occurs in the interstitial space of verbal and nonverbal communication between physician and patient. Technology currently exists to monitor and teach skills or techniques, but the same technology could help to monitor and teach characteristics of humanism, thus, truly connecting humanities and technology by focusing on student-centered learning to address the issues of social and cultural awareness in medical education, and using technology in the classroom.

Innovators in medical school curriculum are embracing how technology and medical humanities together can serve to address the issues raised in the two reports. However, these innovations have been limited in implementation to a small number of

[20] Jed Gonzalo, Paul Haidet, and Daniel Wolpaw, "Authentic Clinical Experiences and Depth in Systems: Toward a 21st Century Curriculum," *Medical Education* 48 (2014): 105.

schools and have yet to become part of the standardized medical school curriculum to prepare the next generation of physicians. This study explores the mechanisms three innovative medical schools are using to incorporate the recommendations, by employing aspects of medical humanities and technology into the curriculum, and how these mechanisms can be implemented more broadly into other medical colleges.

Chapter 2

LITERATURE REVIEW

Medical education is on the precipice of change resulting from a new focus over the last forty to fifty years on ethics and human values as well as a projected shortage of primary care physicians, technological advances, and the rising cost of attending medical school. New requirements from the accreditation organization LCME, coupled with recommendations in 2010 from key stakeholders including the Carnegie Foundation, Institute of Medicine, and Josiah Macy Jr. Foundation are supporting changing medical education to prepare students to address current and unforeseen medical needs in the twenty-first century.[21] Advancements in medical diagnostics and educational pedagogy are leading the charge for change, just as identifying what constituted medical education in the twentieth century created the structure of medical education in the United States.

The Flexner Era

In the twentieth century, the Carnegie Foundation for the Advancement of Teaching took a critical look at the structure of types of medical education offered. It led to what is referred to as the Flexner Report, published in 1910, which called for the professionalization and standardization of medical education. These recommendations still serve as the current structure of medical education: two years of university education focused on gaining a strong science foundation and the last two years of medical school

[21] "Functions and Structures of a Medical School; Cooke, Irby, and O'Brien; Institute of Medicine and Committee on Planning a Continuing Health Care Professional Education Institute; "Preparing Health Professionals for a Changing Healthcare System."

allowing for practical experience in a clinical setting, hospital.[22] This model, referred to as the 2+2 model, is based on German medical education in the early twentieth century and is considered the most advanced by medical educators. A significant outcome of the Flexner Report was the establishment of the accrediting schools granting medical degrees by the LCME in 1942, sponsored by the AAMC and the Council on Medical Education of the AMA.

Historically every twenty-five years since the Flexner Report was accepted as the standard for medical education there have been calls for medical education reform as various medical educators or those interested in medical education suggest that the medical curriculum should be able to adapt to new pedagogy and evolving technology.

A report issued in 1950s suggested the time had come to change the curriculum. The report, called the Western Reserve, called for three areas of curriculum change in the 1950s to regain humanistic interactions between physicians and patients. The three areas were:

> 1) Integration, both among academic disciplines (horizontal) and between pre-clinical and clinical work (vertical); 2) human development, aimed at understanding the human organism in the full process of growth from birth to death instead of maintaining the prior emphasis on the adult male as the biological model; and 3) comprehensive clinical care.[23]

This curriculum movement was not broadly accepted as it also called for including the social sciences. It is mentioned here, as it was on the cusp of identifying the shift of undergraduate education from liberal arts toward pre-medical education.

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[22] Flexner and Updike.

[23] Bloom.

The shift towards science-focused pre-medical education coupled with advancements in medical technology began a movement in the late 1960's to understand where medical ethics and values fit in with the changing time. In the late 1960's scientists and inventors began to create tools allowing people to live with chronic illnesses, unlike the past when the only option was to prepare to die. One example of this technology is kidney dialysis. Several physicians and academics interested in the changing definitions of life began to discuss how the role of ethics and the broader humanities had a connection to the practice of medicine.

The societal expectations of physicians and medical science were in the forefront as distrust of medicine as an institution came under attack with the acknowledgement of the Tuskegee experiments, and with emerging questions of what guidelines medical researchers were following and who was monitoring that research.[24] These examples also arose at a time of general societal unrest and questioning of patriarchal structures, which led to questioning whether medicine could open up opportunities for minority groups including women.[25]

[24] Question raised by physician Henry Beecher at a conference of physicians regarding research oversight as described in David J. Rothman, *Strangers at the Bedside: A History of How Law and Bioethics Transformed Medical Decision Making* (New York: BasicBooks, 1991), and later published in an article "Ethics" *New England Medical Journal* (1966): 1354-1359.

[25] Paul Starr, *The Social Transformation of American Medicine* (New York: Basic Books, 1982), 388-411. The role of minorities is discussed at length in Starr. Kenneth M. Ludmerer, *Time to Heal: American Medical Education from the Turn of the Century to the Era of Managed Care* (Oxford: Oxford University Press, 1999); Rothman, 1-14.

The Growing influence of the Medical Humanities

In 1971, the Society of Health and Human Values held its first session, bringing together a group of individuals interested in the role of humanities and ethics in medical education. Dr. Edmund Pellegrino served as chair, and Lorraine Hunt served as the coordinator for the society. The National Endowment for Humanities (NEH) was newly founded and supported the vision to look at the humanities in the context of medical education and how philosophy and medical ethics contributed to the shaping of physicians. The society created a proposal suggesting medical education needed to incorporate several elements of the humanities, including the need to teach fundamental communication skills in medical school, as well as a curriculum focused on problem-solving in a medical context that relates students' medical knowledge to humanism.[26]

The group's work addressed humanities and medical issues. Ten years later in 1982, a study authored by Edmund Pellegrino and Thomas McElhinney, called *Teaching Ethics, The Humanities and Human Values in Medical Schools: A Ten Year Overview*, illustrates many goals for changing medical education curriculum. The Institute sent out a questionnaire to 125 medical schools "to access the extent of the teaching of human values, ethics and humanities, its geographic and administrative locations, the topography of the teaching faculty, and the kinds of courses offered."[27] The survey was followed up by site visits to the campus to further evaluate "some of the more important

[26] *Proceedings of the First Session, April 12-14, 1971*, Society of Health and Human Values, Philadelphia, PA.

[27] Edmund D. Pellegrino and Thomas K. McElhinney, *Teaching Ethics, the Humanities, and Human Values in Medical Schools: A Ten Year Overview* (Washington, DC: Institute of Human Values in Medicine Society for Health and Human Values, 1982).

characteristics of these teaching programs."[28] The survey report shows the desire, challenges, and dedication to changing the curriculum along with a series of recommendations.

The group spent the next twenty years focusing on the role of humanities and bioethics in medical school curriculum by working with and consulting medical schools. In 1998 the American Society of Bioethics and Humanities (ASBH) was formed "through the consolidation of three existing associations: The Society for Health and Human Values, the Society for Bioethics Consultation, and the American Association of Bioethics."[29] The focus of the new group has been on establishing and publishing definitions and criteria for bioethics committees as well as supporting medical humanities.

There has been a rise in teaching the humanities in medical school for the last forty years. Many advances in science and medical responses toward treating patients began to shift the definition of medicine by expanding how long one can live either with a chronic diagnosis or remain alive in a hospital or extended care facility with the invention of various apparatuses to help one breathe or maintain organ functions. These advancements opened the debate of what is possible, what is ethical, and what these new definitions of life mean, thereby bringing back a desire for studying the humanities. Many credit the return of the centrality of the humanities to medical education to the late

[28] Pellegrino and McElhinney.

[29] "A Brief History," American Society of Bioethics and Humanities, accessed Sept. 1, 2014, www.asbh/org/about/history/index.html.

Dr. Edmund Pellegrino for continually writing about the importance of the humanities in practicing medicine.

Paul Starr's 1982 book, *The Social Transformation of American Medicine*, looks at how medicine and policies related to medicine focused on social aspects of how medicine is practiced in the USA.[30] Starr raises a concern about private industry supporting and lobbying for aspects of healthcare education at the same time that societal and government support was on the decline. He explains how the role of the physician in the U.S. has come to be elevated. Several actions have led to this, but at the most basic doctors have the ability to diagnose and prescribe options for cures when people are in need of care: "They [physicians] serve as intermediaries between science and private experience, interpreting personal troubles in the abstract language of scientific knowledge."[31] Through the development of pharmaceuticals and treatment options, their authority and credibility grew and thus they developed what he terms "professional sovereignty."[32] He points out that physicians in this country achieved a level of power and by leveraging their power created a social structure.[33] The social structure that gives physicians authority is very different in the United States than it is in other countries. It is important to understand how the professional sovereignty and social structure are intertwined in the field of medicine, as it is reflected in the structure of medical education and must be recognized when trying to change the curriculum structure.

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[30] Starr.

[31] Starr, 4.

[32] Starr, 5.

[33] Starr, 4-8.

A report issued in 1984, called "Physicians for the Twenty First Century: report of the Project Panel on the General Professional Education of the Physician and College Preparation of Medicine," was released.[34] The report looked at several factors related to how to prepare medical education for the coming century, from baccalaureate education to clinical education to faculty involvement. Appendixes provided reports on "essential knowledge, fundamental skills, clinical skills, learning skills, medical information science skills, application of scientific method, teamwork skills, personal management skills, and personal qualities, values, and attitudes, and concluded with a survey on the status of medical education."[35] In the section focused on baccalaureate education there were five recommendations for how medical schools should select students. The recommendations included: "1) Broadening Preparation, 2) Modifying Admissions Requirements, 3) Requiring Scholarly Endeavor; 4) Making Selection Decisions, and 5) Improving Communication"[36] The first recommendation spoke to how "College and university faculties should require every student, regardless of major subject or career object, to achieve a baccalaureate education that encompasses broad study in the natural and the social sciences and in the humanities."[37] As the report discusses many enter college with an end goal of entering a profession, missing the purpose of what a liberal arts education provides, "to sharpen one's critical and analytical skills and to investigate

[34] "Physicians for the Twenty-First Century: report of the Project Panel on the General Professional Education of the Physician and College Preparation of Medicine (GPEP)," Part 2, *Journal of Medical Education* 59, no. 11 (1984).

[35] "Physicians for the Twenty-First Century," Table of Contents iii-iv.

[36] "Physicians for the Twenty-First Century," 7-10.

[37] "Physicians for the Twenty-First Century," 7.

the varieties of human experience through balanced studies in the natural and social sciences and in the humanities."[38]

Mount Sinai School of Medicine developed a Humanities and Medicine Program in 1987. It began to accept into medical school each year thirty-five students who majored in humanities, not premed. Students would apply as college sophomores or juniors. The program was "designed to determine the extent to which the MCAT and traditional premed courses in organic chemistry, physics, and calculus are necessary for successful completion of a medical school curriculum."[39] Part of the idea was to recruit students who were "interested in the humanistic elements of medicine to seriously consider pursuing a medical career."[40] Despite the study showing no significant differences between student success in medical school between the two groups, the idea has yet to be broadly accepted. Muller and Kase show the continued connection to tradition.

Samuel Bloom in 1988 his article "Structure and Ideology in Medical Education: An analysis of Resistance to Change," describes how not only curriculum recommendations but also the need to maintain the structures where medical education/healthcare occurs prevent real change from happening. He writes:

> The incorporation of modern science requires large multipurpose organizational structures; these, in turn, produce competitive divisions internally. When the general mission of medical education is subordinated to the operational requirements of the social organization, the protection of territorial domains supersedes the achievement of

[38] "Physicians for the Twenty-First Century," 7.

[39] David Muller and Nathan Kase, "Challenging Traditional Premedical Requirements as Predictors of Success in Medial School: The Mount Sinai School of Medicine Humanities and Medicine Program," *Academic Medicine* 85, no. 8 (2010).

[40] Muller and Kase.

> education goals as the driving force of the institution. We refer to this phenomenon as the dominance of structure over ideology.[41]

This article is important as it addresses the dichotomy between the mission of education and the mission of finance within an organization. Bloom emphasizes that promoting all participants' understanding of the focus of the organization makes organizational and cultural change possible.

Kenneth M. Ludmerer's 1999 book, *Time to Heal: American Medical Education from the Turn of the Century to the Era of Managed Care*, explores the American medical education experience.[42] Ludmerer explains how medical education was intentionally structured with university education as a result of the Flexner Report and how over the course of time societal and political issues changed the direction and focus of medical education. He also discusses the demographic shift caused by the aftermath of World War II and baby boomers forcing the expansion to suburbs. He further discusses the influence of Civil Rights and women's movement calling for minorities and women to be allowed into medical school.

The expanding population of baby boomers drove how and where medicine was practiced. Ludmerer illustrates how demand for services led to medical centers being built away from the core university campus, thus the shift away from scholarship toward clinical work. This new structure slowly shifted medical education away from the university campus but also away from teaching students to seeing patients, modeling the PPR, toward faculty being encouraged to see more patients per the managed care

[41] Bloom, 301.

[42] Ludmerer.

movement in the 1980's. This took faculty away from researching and teaching students. Instead, patients were treated and discharged at quicker rates than previously deemed acceptable. At the same time state and federal governments were cutting policy and support for academic centers. He argues, "the greatest deficiency of medical education throughout the twentieth century . . . was the failure to train learners properly for clinical uncertainty, which led to the systematic overuse in medical practice of tests, procedures, and treatment."[43] He closes the book predicting the United States has an opportunity to remain at the forefront of medical education as long as the social contract between medicine and society remains a focal point.[44] This book addresses some of the reasons why medical education is currently reforming its curriculum and predicted medical education would shift to address societal needs as the Carnegie 2010 and Macy's reports support.

Factors driving the call for reform

The Education of Medical Students: Ten Stories of Curriculum Change is very relevant to the topic of this dissertation as it recommends that medical school deans or deans of curriculum discuss the opportunities and challenges of changing medical school curriculum in the late 1990's up to the new century.[45] One of the ten stories, authored by David Irby, vice dean of Curriculum at University of San Francisco's medical school, describes how the call to change the school's curriculum came from external sources. The

[43] Ludmerer, 378.

[44] Ludmerer, 399.

[45] Raymond H. Curry, *The Education of Medical Students: Ten Stories of Curriculum Change* (Washington, DC: Association of American Medical Colleges, 2000).

change process was developed in stages to allow various groups to have input. This model of change has longevity and served as a foundational piece for other schools to follow.

In 2003, Judith Rodin, President of the University of Pennsylvania (Penn), gave a lecture describing the growth, fall, and recovery of Penn's academic health centers (AHC).[46] She articulated the process of having a plan, working toward its success only to have a funding strategy fail, and the need for self-reflection within the organization to continue forward to succeed. The lecture is important to this dissertation as it highlights the contradictory position educational healthcare facilities are in: they are to provide state-of-the-art care in order to gain and maintain funding while also serving everyone in need of healthcare and participating in research for future medical discoveries. The essential part of her lecture in relation to this dissertation is the systems restructuring necessary from within the University as a whole to save the academic health centers at a time when the two branches of the institution could have parted ways.

The decision to preserve the AHC as part of the University resulted in looking at how various academic departments could inform medical education and vice-versa, thereby causing horizontal and vertical interaction. Equally important was everyone's commitment to working toward the mission of the whole university. "The integration, across departments with the AHC, across research, teaching, and patient care activities, and with the entire research university beyond its walls when the medical school is part

[46] Judith Rodin, "A revisionist View of the integrated academic health center," 2003 Robert H. Ebert Memorial Lecture, Milbank Memorial Fund, accessed Nov. 19, 2014, http://www.milbank.org/uploads/documents/EbertRodin0502/RodinEbert.pdf.

of a larger university, is one way to transform the culture of academic health centers."[47] This interdisciplinary perspective provided Penn with the opportunity to look at itself anew and provided ways for faculty and students from various academic disciplines to interact with each other: bioinformatics, policymakers, engineering, journalists, artists, architecture and regional planning all intersected with each other to improve student learning.

Changing or reforming curriculum to respond to current and future needs while addressing current regulations and criteria requires constant attention and oversight. To mark the 100-year anniversary of the Flexner Report several foundations and medical journals issued papers and articles discussing the effect the Flexner Report has had on medicine in the United States. In 2010 a report called *A Summary of Educating Physicians: A Call for Reform of Medical School and Residency* was published, calling for change the curriculum and structure of medical education.[48] The report has become a focal point for bringing change to medical education. The report demonstrates that twenty-first century technology necessitates a change to medical education to educate students in ways they are used to learning and ultimately to help them treat and care for their patients. Suggestions of curriculum changes include understanding and using new technology to diagnose, treat, and communicate with patients, as well as understanding social and cultural determinants of health and how to problem solve with medical teams and patients. Another critical adaptation is to incorporate current knowledge regarding how students learn. The 2+2 model, while beneficial for standardizing medical education,

[47] Rodin.

[48] Cooke, Irby, and O'Brien.

has not adapted to current best practices. The advancement of educational pedagogy suggests that individuals learn at different paces and in different ways; this has not been incorporated into medical education. The new recommendations suggest medical education become learner centered, meaning students progress at their own pace rather than in a standardized time-period. Other recommendations include having students begin working with patients upon entering medical school to help improve communication and longevity of patient relationships, thus improving understanding for the humanities in medical practice; supporting and developing the habits of inquiry; as well as incorporating professional identity formation.

Current studies indicate two tidal shifts that will intersect and cause change: the rising cost of medical education and the shortage of physicians, approaching 64,000 in 2015 and 140,000 in 2025; with the baby boomer generation approaching retirement, one third of doctors will retire.[49] While there has been a push to accelerate the move of nurse practioners and physician assistants into primary care, the projected shortage will affect patient care.

There are four groups responsible for the oversight of medical college curriculum. The groups are: the LCME, which governs medical school curriculum; the USMLE, given by the NBME; the MCAT, a program of the Association of American Medical Colleges; and the ACGME.[50] The LCME works in concert with its sponsors "the

[49] Topol, 187.

[50] The LCME is recognized by the U.S. Department of Education as an accrediting agency for medical education programs leading to the MD degree. For simplicity, the LCME website contains references to "schools" instead of "medical education programs leading to the MD degree." Though references on the LCME website to "schools" are synonymous with "medical education programs," the distinction between programmatic accreditation vs. institutional accreditation is an important one. Institutional accreditation is granted by regional accrediting agencies and is required to qualify for federal financial assistance programs authorized under Title IV of the Higher Education Act. "About the Liaison

Association of American Medical Colleges (AAMC) and the Council on Medical Education of the American Medical Association (AMA)."[51]

The publication "Building a Better Physician—The Case for the New MCAT" made a compelling argument for supporting the changes. "Tomorrow's physician will need to understand demographic changes, the effect of culture on adherence to medications, and the ways in which changes in incentives and payment systems will affect their practices."[52] The article goes on to discuss how preparation for medical school needs to be broader than a student's ability at science or memorization skills. It makes the case for the whole person to be considered when reviewing applications from medical school applicants. The article concludes by suggesting the revised MCAT is not the panacea for changing how medicine is practiced. "Medical schools will need guidance in developing and delivering curricula that meet high scientific standards while best serving the needs of patients and society."[53] The multiple layers of coordination and buy-in to begin the curriculum change process is vast.

Once students have entered medical school, they must prove they have learned the necessary skills to graduate. Four exams are given to all students while in medical school. The USMLE are given by the NBME, an organization formed in 1915 to begin to provide exams to hold medical schools and their students accountable for learning. The National Board Exams serve as the standard for successfully mastering a set of knowledge and

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Committee on Medical Education."

[51] "About the Liaison Committee on Medical Education."

[52] Kaplan, Satterfield, and Kington.

[53] Kaplan, Satterfield, and Kington.

skills. "The United States Medical Licensing Examination (USMLE) is a three-step examination for medical licensure in the United States and is sponsored by the Federation of State Medical Boards (FSMB) and the National Board of Medical Examiners (NBME)."[54] The USMLE first test, called Step 1, is an all-day, eight-hour test. It consists of "approximately 325 multiple-choice questions, divided into seven 60-minute blocks."[55] The test is taken in a test center on a computer. The second test, Step 2, is a two-part exam occurring over two full days. The first part measures a student's clinical knowledge (CK). The test takes nine-hours, and is taken at a testing center. The clinical knowledge is measured via "approximately 350 multiple-choice questions, divided into eight 60-minute blocks."[56] The second part of the Step 2 exam uses standardized patients who test students' Clinical Skills (CS). The students are tested on "their ability to gather information from patients, perform physical examinations, and communicate their findings to patients and colleagues."[57] The test consists of "12 patient cases: Fifteen minutes for each patient encounter plus ten minutes to record each patient note." Students take the third step after passing Steps 1 and 2 and graduating from medical school. The exams are required for all medical students in accredited programs in the United States. The results of the exams, which are ranked the same across the country, creates a baseline that enables assessors to view medical students on the same basis. The NBME's role in

[54] "Bulletin of Information," United States Medical Licensing Examination, 2015, accessed Apr. 26, 2015, http://www.usmle.org/pdfs/bulletin/2015bulletin.pdf.

[55] "Bulletin of Information," 9.

[56] "Bulletin of Information," 9.

[57] "Bulletin of Information," 10.

providing standardized tests serves as a measurement of knowledge gained by medical students and ensures medical education consistency.

Educational research suggests the notion of learning across the curriculum increases the students' ability to synthesize information. A recent post on the medical education blog at the University of Saskatchewan suggested, "Teaching is one of the oldest professions. It just needs a new wardrobe for the twenty first century."[58] The various changes in how medicine is delivered require changing how medicine is taught. Medical education curriculum is different from other professional curriculums and as Stephen Klasko, MD, CEO of a medical school, said in an interview, the curriculum needs to change: "It's about seeing versus observing. To see is to see linearly, to see the DNA, but to observe is to recognize what signals the patient is giving you. We believe the folks we accept based on empathy and self-awareness will be better partners, better fathers or mothers, and better in their work-life integration."[59]A current blog focuses on how medical education needs to change and provides insights and suggestions currently in use in medical classrooms.[60]

The first decade of the twenty-first century offered medical schools an opportunity to understand how funding options were changing, offering some solutions

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[58] Deirdre Bonnycastle, "Is the End of Lecturing, the End of Teaching?," *Deirdre Bonnycastle's Blog on Teaching in Medicine: Medical Education Blog*, Sept. 24, 2014, accessed Nov. 30, 2014, http://words.usask.ca/medicaleducation/2014/09/24/is-the-end-of-lecturing-the-end-of-teaching/.

[59] "Radical Innovator in Healthcare—Stephen Klasko," Work/Life Integration Project, Nov. 25, 2014, accessed Nov. 27, 2014, http://worklife.wharton.upenn.edu/2014/11/radical-innovator-healthcare-stephen-klasko/.

[60] Deirdre Bonnycastle, "How Do People Learn to Do X?," *Deirdre Bonnycastle's Blog on Teaching in Medicine: Medical Education Blog*, Feb. 4, 2014, accessed Apr. 26, 2015, http://words.usask.ca/medicaleducation/2014/02/04/how-do-people-learn-to-do-x/.

while highlighting other challenges. Technology in all forms, from instructional technology to personal hand-held devices, became prominent for personal and professional communication. As much work was done in reviewing the last 100 years of medical education, it allowed reflection on the current and future possibilities. As computer assisted technology continues to expand into all aspects of individual and organizational life, it is important to recognize that individuals are still wrestling with its integration into medical school and medical practice. The data provided offers wonderful information, but the training around how the data is collected, viewed, shared, and communicated still needs to be designed.

The Emergence of Information and Communication Technologies in Education

Philosopher Martin Heidegger raised the question of what technology means to society in his essay "The Question Concerning Technology."[61] He goes back to the Greek root of the word *techne* and analyzes how the word has evolved. "Is technology a tool, or is it the answer for creating solutions?"[62] This work is interesting to the research in this dissertation as it helps to explain why there is a fear, real or perceived, of how technology comes to exist in various avenues of daily life.

Technology, historically, has been part of medical education but it wasn't until the 1990s that computer-based tools were initially integrated into medical school curriculum. In this paper, technology will be defined to describe the use, integration, and impact of

[61] Martin Heidegger, *The Question Concerning Technology, and Other Essays* (New York: Harper & Row, 1977).

[62] Heidegger.

these tools into instructional materials. These tools include the use of virtual patients, visualizing surgical procedures using 3D models, as well as curriculum delivery methods that are changing classrooms from the lecture style to student-centered learning via online teaching labs, electronic portfolios for mastery-based assessment, and online instructor-learner collaboration tools.

Early work in teaching students how to communicate with virtual patients demonstrated an improvement in preparing students to communicate and diagnose patients by allowing them time to practice the technique. The initial study, "The use of virtual patients to teach medical students history taking and communication skills," was published in 2006 and since then technology has continued to improve.[63] Many medical schools use actors who serve as standardized patients, but the virtual patient allows students to practice when they have the time and has the capacity to provide feedback to the student and instructor.

Technology exists in every realm of daily life. One needs to ask the question: what is lost in the transition to adapt to technology? Physician Caroline Wellberry writes, "technology has become so integral to our professional training and practice that we have institutionalized its presence as a third party in all of our medical environments, from medical education on up."[64] She goes on to discuss how the focus on technology and the ability to stay up-to-date may interfere with a physician's ability to stop, think, evaluate

[63] Amy Stevens et al., "The Use of Virtual Patients to Teach Medical Students History Taking and Communication Skills," *The American Journal of Surgery* 191, no. 6 (2006): 806-11, http://ezproxy.drew.edu/login?url=http://search.proquest.com/docview/1031215191?accountid=10558.

[64] Caroline Wellbery, "A Piece of My Mind: Our Ubiquitous Technology," *JAMA* 307, no. 12 (Mar. 28, 2012): 1263-64, accessed Feb. 6, 2013, http://jama.jamanetwork.com.exproxy.drew.edu/article.aspx?articlei.

and most importantly to "practice the physician's time-honored ministrations to a patient in need. Our focus on our machines takes away from this sort of raw presence that was once considered almost sacrosanct. The threesome with our devices has altered the terms of our engagement."[65]

The changes technology brings to the practice of medicine, let alone the learning of medicine, are vast. This dissertation looks at technology as a teaching/assessment tool and as a way to improve communication with patients and colleagues.

The 2010 Carnegie Report calls for embracing technology as part of the medical student's curriculum exposure. Dr. Asmin Azzam in a 2013 article discusses the important role a teacher/guide has in helping medical students decipher and navigate the vast amount of information that exists. He, along with others, suggests medical students must be taught how to be life-long learners if they are to be successful practitioners. As medical school is no longer just about acquiring knowledge, as he points out: "learners in the developed world now already have access to more information at all times at their fingertips than exists in all their faculty members' collective brains."[66] Azzam suggests the role of medical school staff is to "assist their learners' professional identity formations, role-modeling lifelong learning, and sharing how a professional sifts through the mountain of information to determine what is appropriately high quality and sufficiently reliable to use in the care of one's patients."[67]

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[65] Wellbery.

[66] Amin Azzam. "As Technology and Generations in Medical Education Change, What Remains Is the Intersection Between Educator, Learners, Assessment and Context," *International Review of Psychiatry* 25, no. 3 (Jun. 2013): 347-56, accessed Nov. 5, 2014, http://informahealthcare.com/doi/abs/10.3109/09540261.2013.787048.

[67] Azzam, 353.

Azzam stresses, "actual learning will only be optimized if put into the framework of a meeting between teacher, leaner, assessment, and context."[68] The context for learning using data captured electronically is vast in medical school, given the various assessment techniques that capture, evaluate, and statistically rate the learner. Many medical schools have some version of electronic assessment, and to ensure compliance use the ACGME Core Competencies.

A recent study at Vanderbilt Medical Center in Tennessee, *Comparing Content Coverage in Medical Curriculum to Trainee-Authored Clinical Notes*, worked to "provide a first step toward addressing the challenge of matching what is taught to what is experienced."[69] Using medical informatics, the deans and instructors were able to compare students' clinical notes and the curriculum, specifically examining what information was carried over and what information was being noted in electronic charts, but not acted upon. These types of studies are occurring across medical colleges. The ability to interpret the data requires that deans and instructors take time to review and understand the story in the numbers and then have the ability to adapt the curriculum to address needs as they arise. This article highlights integrating technology by incorporating a mechanism to measure change, as well as understanding and acting on information gleaned.

A similar study at UCSF looked at the data collected by first-year medical students in the note section of its patient-encounter logs. The log is a web-based platform

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[68] Azzam, 354.

[69] J. C. Denny et al., "Comparing Content Coverage in Medical Curriculum to Trainee-Authored Clinical Notes," *AMIA Annual Symposium Proceedings*, 2010, 157, accessed Sept. 10, 2014, http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3041398/.

accessible to instructors and physicians to see what interactions have occurred between patient and physician/trainees. The authors looked at their medical school logs to see how the data could be used to support or improve student learning.[70] The authors "propose medical education would benefit substantially from an understanding of students' perspectives on patient-encounter logs, and a clear analysis of how students enter, review and use the information."[71] The authors suggest medical education improve supporting structures surrounding technology rather than technology itself. They recommend the transformation of the logs from a repository to an important resource that enhances student learning by the teacher helping the student navigate symptoms, information available, and decision-making models. They propose the instructional tools provide information to promote first-year students' ability to absorb and sort through the vast amount of information to understand the relevance to treating patients, thus engaging students if the captured information is used immediately and over a period of time to evaluate the students' learning.

Another tool for learning skill proficiency is virtual patient simulators. The virtual patient simulates patient encounters in a computer-based format. Many medical schools use patient simulator labs, where actors serve as patients and interact with the doctor in training. Rachel Ellaway, a dean of curriculum and professor, studies online learning, simulation and theory, as well as how technology is developed and used in medical and health education. She researched how virtual patients are being used. She suggests the

[70] Bridgette O'Brien, V. L. Cai, and Amin Azzam, "Understanding the Educational Value of First-Year Medical Students' Patient Encounter Data," *Med Teach* 33, no. 4 (2011).

[71] O'Brien, Cai, and Azzam.

virtual patient be thought of using an activity theory versus being thought of as an object. She defines activity theory "as a body of thought focused on describing and understanding the complexities of human activity, and as such it provides a range of different perspectives and models that describe different aspects of what activity is and how it comes about."[72] She suggests viewing the virtual patient through activity theory expands the opportunity to use it in various contexts. She further suggests the question is no longer if virtual patient or other technology works as an instructional tool; rather, it is time to use the tools to support activities to give greater context and understanding. "Virtual patients may scaffold activities by providing learners with structure, focus, agency, and clear indications of progress in attaining goals."[73] She contends, "it is the virtual patients and the ways that they are used that confers educational value."[74] She cautions given any scenario presented by the facilitator, the virtual patient may weigh in on a given incident, diagnosis, or treatment option.

The virtual patient offers an introduction to activity theory and creates a natural introduction for other instructional technology. High frequency mannequins are one example. They are mannequins designed to look, feel, and behave like human beings in various medical scenarios. A control room monitors and directs how a simulation plays out. For example the simulation can train students how to draw blood, deliver a baby, perform by-pass surgery, treat war related injuries, etc. "By combining traditional training methods with didactic material and procedural training in a safe environment,

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[72] Rachel H. Ellaway, "Virtual Patients as Activities: Exploring the Research Implications of an Activity Theoretical Stance," *Perspectives on Medical Education* 3, no. 4 (2014): 266.

[73] Ellaway, 271.

[74] Ellaway, 275.

medical simulators allow medical training programmes to educate health care professionals in a flexible and less costly environment."[75] The use of medical simulation has increased as technology has increased the experience to be more life-like. "As the simulator provides highly accurate scenarios, uses actual or very realistic tools and affords opportunities to manage patient complications, trainees can receive very effective training, repeating procedures at their convenience and without impacting patient safety."[76] The ability to practice on equipment and simulated patients improves students' confidence levels and provides a context to their learning process.

Studies are also indicating "medical schools must teach core biomedical informatics competencies that address health information technology (HIT)."[77]One outcome shows by teaching these competencies that opportunities are created to "teach these topics with new emphasis on patient safety, team-based medical practice, and evidence-based care. Overarching HIT competencies empower our students to be lifelong technology learners." The level of information students need to access along with the inquisitive skills and ability to adapt to emerging technology and the information gleaned from them builds the case for changing curriculum of interest to research for this dissertation.

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[75] Kunkler, Kevin, "The Role of Medical Simulation: An Overview," *The International Journal of Medical Robotics and Computer Assisted Surgery* 2 (2002): 206, accessed Apr. 10, 2013, http://nlinelibrary.wiley.com.

[76] Kunkler, 206.

[77] M. M. Triola et al., "Health Information Technology and the Medical School Curriculum" *American Journal of Managed Care* 16, no. 12 (Dec. 2010): 54-56, accessed Sept. 17, 2014, http://www.ncbi.nlm.nih.gov/pubmed/21314222.

Changing or reforming curriculum to respond to current and future needs while addressing current regulations and criteria requires constant attention and oversight. In the last ten to twenty years articles in *Academic Medicine* and *Journal of American Medical Academy* (*JAMA*) call for increased professionalism and problem-solving skills. One article took all of the articles to task, suggesting that despite calls for change real reform is yet to be developed.[78] The word *professionalism* as used in medicine describes one's ability to communicate clearly, behave in an ethical manner, and think outside of the box; all skills inherent in a humanities education. Some medical schools have a one-semester course in professionalism while others suggest professionalism be taught in specific courses. Professionalism is the phrase used to incorporate all of the non-technological skills necessary for a physician to take care of a patient. Educational research suggests the notion of learning across the curriculum increases the students' ability to synthesize information; in this dissertation, medical humanities is the subject to be integrated.

The various changes in how medicine is delivered require changing how medicine is taught. Specifically, it is important to consider the organizational change methods medical colleges use to transform curriculum. The Geisel School of Medicine at Dartmouth is one medical school that recently used organizational change to guide them through the process.[79] The desire to change and the authority to change traditionally originates from the top leadership, but requires understanding and buy-in from faculty

[78] Susan Skochelak, "A Decade of Reports Calling for Change in Medical Education: What Do They Say?," *Academic Medicine* 85, no. 9 (Sept. 2010): 26-33.

[79] "Geisel School of Medicine."

and staff at all levels. Technology is forcing change at all levels as prices and accessibility are becoming more prevalent concerns; one medical education blogger suggests "combining real people with simulation technology is the next step forward in medical education for providing our students with safe and effective learning at absolutely no risk to patients."[80] The next stage is working with current educators and students to bring about the change of how the organization embraces curriculum change.

There are many possibilities for how simulation can be used, the question of who decides how it is used and in what capacities are at the forefront of integrating new curriculum into existing structures or working toward creating a new structure/vision. Dr. David Gaba wrote, "The diverse applications of simulation in healthcare can be categorized by 11 dimensions: aims and purposes of the simulation activity; unit of participation; experience level of participants; healthcare domain; professional discipline of participants; type of knowledge, skill, attitudes, or behaviors addressed; the simulated patient's age; technology applicable or required; site of simulation; extent of direct participation; and method of feedback used. Using simulation to improve safety will require full integration of its applications into the routine structures and practices of healthcare."[81] The goal of medical education is to prepare physicians to treat patients; many of the skills regarding human interaction and communication could be introduced

[80] Felise Milan "Hybrid Cases Teach Medical Students Real Lessons," The Doctor's Tablet Blog: Albert Einstein College of Medicine at Yeshiva University, Nov. 7, 2013, accessed Apr. 26, 2015, http://blogs.einstein.yu.edu/hybrid-cases-teach-medical-students-real-lessons/.

[81] David M. Gaba, "The Future Vision of Simulation in Healthcare," *The Journal of the Society for Simulation in Healthcare* 2, no. 2 (Summer 2007): 126-35.

using the latest instructional tools. Part of the process is overall integration across the curriculum, and throughout the healthcare delivery system.

Interprofessional Education (IPE) is another emerging trend that responds to the 2010 Carnegie Report calling for training medical students to work in healthcare teams. IPE appears to have begun in England in nursing education and quickly has spread, as the different styles of how various healthcare professionals communicate with patients correlates with healthcare quality and delivery.[82] Major support for IPE efforts has existed since working to resolve issues raised by the Institute Of Medicine's (IOM) 1999 *To Err is Human* report, documenting the number of healthcare errors resulting in patients dying.[83] While the notion of Healthcare teams has been in existence since at least the 1970s, with the release of the IOM's report the emergence of technology changing how learning can occur has only recently allowed medical education to begin to be practiced. A report released in 2011 discusses the history in the U.S. regarding IPE and how early conversations suggested IPE was a way to educate health professionals in various areas to begin to incorporate many things including the humanities.[84] They suggest it is:

the obligation of academic health centers to conduct interdisciplinary education

[82] CAIPE uses the term "interprofessional education" (IPE) to include all such learning in academic and work based settings before and after qualification, adopting an inclusive view of "professional." "Defining IPE," Centre for the Advancement of Interprofessional Education, 2002, accessed Apr. 26, 2015, http://caipe.org.uk/resources/defining-ipe/.

[83] "To Err Is Human: Building a Safer Health System," Institute of Medicine: Shaping the Future for Health, Nov. 1999, accessed Apr. 26, 2016, https://www.iom.edu/~/media/Files/Report%20Files/1999/To-Err-is-Human/To%20Err%20is%20Human%201999%20%20report%20brief.pdf.

[84] Interprofessional Education Collaborative Expert Panel, *Core Competencies for Interprofessional Collaborative Practice: Report of an Expert Panel*, (Washington, DC: Interprofessional Education Collaborative, 2011), accessed Feb. 28, 2015, http://www.aacn.nche.edu/education-resources/IPECReport.pdf.

> and patient care; to develop methods to link that education with the "practical requirements" of health care; to use clinical settings, especially ambulatory settings, as sites for this education; to integrate classroom instruction in the humanities and the social and behavioral sciences.[85]

The possibilities for incorporating IPE with simulation labs while using humanities are vast. U.C. Berkeley Joint Medical Program is in the early stages of combining all three aspects into their medical education program by partnering with a health professionals school in Berkeley. A medical anthropologist has assisted with some of the course content.[86]

Emerging Trends in Medical Education

An emerging trend stemming from changing how and where medical students receive knowledge also affects faculty members who have been trained in the tradition of doing. They are now being asked to change from lecture style to small group interaction. This shift in power structure from faculty at the front of the room dispensing knowledge to on the sidelines facilitating learning and interacting one-one-one with medical students has many faculty members wondering how to train future faculty members.[87]

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[85] Interprofessional Education Collaborative Expert Panel, 3.

[86] Course director, interview by author, Dec. 8, 2015.

[87] Jennifer R. Kogan and Eric S. Holmboe, "Preparing Residents for Practice in New Systems of Care by Preparing Their Teachers," *Academic Medicine* 89, no. 11 (2014): 1436; Steven M. Block, Roberta E. Sannino, and Lisa Bellini, "Defining 'Faculty' in Academic Medicine: Responding to the Challenges of a Changing Environment," *Academic Medicine* 90, no. 3 (2015): 279-82.

Chapter 3

METHODOLOGY

This study employed a comparative study research design using qualitative data. According to Robert Yin, "a case study investigates a contemporary phenomenon in depth and in its real-world context."[88] The nature of the research questions in this study required an in-depth exploration into accreditation policies in regard to curriculum, articles from key figures in medical education, interviews with educational leaders, and best practices in regard to medical education. The complexity of the variables made the qualitative paradigm a logical choice for the type of data to be used within the case study.

Definition and Description of Qualitative Case Study Method

Qualitative Research allows for gathering descriptive information based on narrative formats that include existing materials in reports, websites, and articles, as well as interviews. A case study examines a single unit of analysis over time. "A case study is an in-depth description and analysis of a bounded system."[89] This study is a multi-case or comparative case study as it looks at three medical schools. Conducting interviews allows one to learn the intricacies involved with implementation, thus strengthening the case with tangible data.

[88] Robert K. Yin, *Case Study Research: Design and Methods*, 5th ed. (Boston: SAGE Publications, 2013), 237.

[89] S. B. Merriam, *Qualitative Research: A Guide to Design and Implementation*, 3rd ed. (San Francisco, CA: Jossey-Bass, 2009).

According to Yin, a major proponent for research gleaned through qualitative case studies "allow for an in-depth understanding of the topic because one can 'collect data in natural settings, compared to relying on "derived" data (Bromley, 1986, p. 23)'—e.g., test results, school and other statistics maintained by government agencies, and responses to questionnaires."[90] The case study allows researchers to evaluate contemporary issues that are occurring when not enough time has passed to evaluate commonalities or differences in traditional formats such as historical analysis. Yin defines the case study as:

> an empirical inquiry that investigates a contemporary phenomenon (the case) in its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident. The second part of the definition points to case study design and data collection features, such as how data triangulation helps to address the distinctive technical condition whereby a case study will have more variables of interest than data points.[91]

A comparative case study looks at two or more cases for common themes to emerge, allowing for comparisons across sites or programs. Comparative case studies allow for analysis and synthesis of patterns that illustrate similarities or differences among similar programs, organizations or institutions. Prominent methods in case study data gathering include "fieldwork visits, observation, interviews and document analysis."[92]

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[90] Robert K. Yin, to appear in *Complementary Methods for Research in Education*, 3rd ed. (Washington, DC: American Educational Research Association, forthcoming), http://www.cosmoscorp.com/Docs/AERAdraft.pdf.

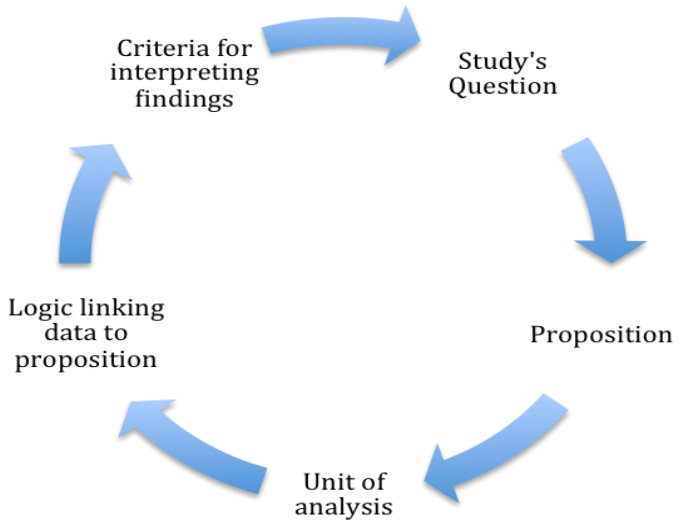
[91] Yin, *Case Study Research: Design and Methods*, 2 and 16.

[92] D. Goodrick, *Comparative Case Studies, Methodological Briefs: Impact Evaluation 9,* (Florence, Italy: UNICEF Office of Research, 2014).

This comparative case study examines how three medical schools invested in reforming their curriculum to meet recommendations in the Cooke and Macy reports. As this research focuses on an exploratory model the comparative case study was the best approach to create an analysis. A key study feature of the case study allows for describing the relationships that exist within an organization. Yin suggests there are five components necessary for effective case studies. The diagram below shows the interdependency of each component for the validity of the study.

The five components as defined by Yin are depicted as part of a continuum, as shown in Figure 3.1:

Figure 3.1



Source: Diagram based on the discussion of case study designs in Yin, Robert K., Case study research: Design and methods, fifth edition, Sage, Los Angeles, 2014, 29.

The study question provides a focus and serves to guide the study. The proposition "directs attention to something that should be examined within the scope of

the study."[93] In this study the question is: If medical schools use an organizational change model (culture change) focusing on integrating medical humanities with the latest technological tools, then does the medical school create a sustainable curriculum that increases student engagement?

The unit of analysis describes what will be studied based on the question and the proposition. The unit of analysis also needs to allow for previous and future results to be compared. Using four of the suggestions raised in the 2010 Carnegie and Macy Jr. Foundation Reports for improving medical education this study looks at how the three medical schools are addressing the concerns to create a sustainable model in medical education for future generations.[94]

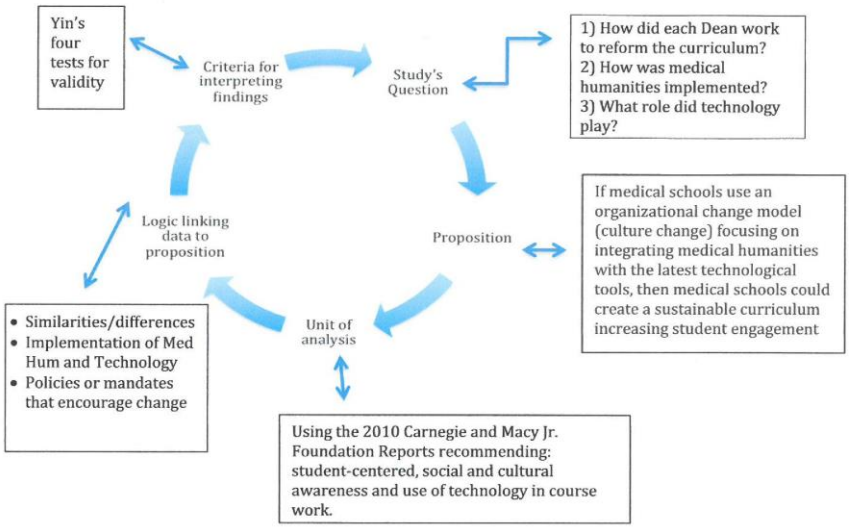
The logic linking the data to be analyzed includes comparisons and contrasts across the three schools, an explanation of processes, and the time periods from planning to implementation; additionally, any policies or mandates that encourage or support the change will be reviewed.

The criteria for interpreting the findings allows for comparison of the data against the proposition are Yin's four tests for validity. The diagram below applies to this study.

[93] Yin, *Case Study Research: Design and Methods*, 30.

[94] Cooke, Irby, and O'Brien; "Preparing Health Professionals for a Changing Healthcare System."

Figure 3.2



Dimensions of Analysis: Data to be collected

This qualitative comparative case study examines three medical schools in different areas of the country invested in changing their curriculum to prepare students to address current and unforeseen medical needs in the twenty-first century.[95] Advancements in medical diagnostics and educational pedagogy allow for new formats for teaching medical students to acquire and assimilate knowledge. The research looks at the process of creating the model for best practices, implementation of the model, and outcomes of that change as it relates to how deans are supporting technology and medical humanities to address social cultural awareness and student-centered-learning. While the three schools began the change process at different stages they allow for comparison as

[95] "Functions and Structure of Medical School"; Cooke, Irby, and O'Brien; Institute of Medicine and Committee on Planning a Continuing Health Care Professional Continuing Education Institute; "Preparing Health Professionals for a Changing Healthcare System."

each addressed accreditation, leadership, funding, assessment, pedagogical change, and cultural change within their respective organizations. This study only looks at leadership including cultural/organizational change, pedagogical transformation to include medical humanities, and the use of technology integration at each school. This study is not looking at funding and assessment aspects, as these two facets require a different level of leadership either at the respective university leadership level, state legislation, or national accreditation.

Research Protocol

Overview of Case Study

The goal for this case study was to look at the mechanisms innovative medical schools use to incorporate aspects of medical humanities and technology into the curriculum and to consider whether the mechanisms are transferable to other medical colleges.

The following three over-arching questions and sub-questions guided the research in terms of understanding where medical humanities fits into the curriculum and what types of technology changes have been made:

1) How were the Deans able to steer the curriculum reform toward student-centered learning and social cultural awareness as Cook and Macy reports suggested?

   a. What influenced the changes (where they internal or external)?

   b. What was the original goal of each school? Has the goal changed?

The hypothesis: if schools used an organizational change method, then the process could be modeled at other medical schools.

2) How did the curriculum reform integrate medical humanities?

   a. How are the humanities used in courses?

   b. How did the structure of content delivery change?

   c. Are the humanities available as an extra-curricular program?

   The hypothesis: if the curriculum change is implemented then change has occurred with everyone's buy-in.

3) What was the role of technology's integration into the curriculum?

The hypothesis: If the schools incorporated technology into the curriculum, then a prototype exists for other schools to replicate.

The theoretical framework and key readings in this case study began with the Flexner Report published in 1910 by the Carnegie Foundation. It has served as the baseline for how medical education should be structured. Almost every twenty-five years articles or reports were published calling for the structure to change. The centennial celebration of the Flexner Model provided an opportunity to look at the edifice of medical school curriculum alongside the evolving development of technology and research on adult learning. Thus several articles and reports were written and the Carnegie Foundation published a report, *Educating Physicians: A Call for Reform of Medical School and Residency*. This report served as a basis for understanding recommending change and implementing change are two very different ideas. Thus, the researcher began to look at medical schools already incorporating ideas cited in the 2010 report.

Following protocol guided how the case study was conducted. The researcher spoke with curriculum specialists regarding how to begin to research how schools were restructuring or changing their curriculum. The recommendation for using a comparative case study was made. In reading case studies and *Case Study Research: Design and Methods*, the researcher recognized this was the evaluation tool to use.

Data Collection Procedures

Data Collection Plans

Data Collection Plans included reading several articles and reports issued in 2010 and articles focusing on curriculum innovation in medical schools. It became evident that while individual faculty members may be innovating, for the idea to be sustained and implemented across the curriculum, the innovation and integration needed to be supported at a top level.

Academic Affairs or Offices of Education serve the curriculum oversight function at medical colleges. These offices report to the accreditation committees and to the university in regard to education of medical students. Thus, speaking with Vice Deans of Education or Academic Affairs became the logical method to understand how one implements curriculum changes. The Education or Academic Affairs Offices publish articles or reports every few years describing the curriculum within the school either as stand-alone reports or as part of the school's annual report. Two criteria for school selection were the use of technology and medical humanities in existing curriculum.

Expected Preparation Prior to Fieldwork

Expected preparation prior to fieldwork: Finding which medical schools to observe in person and interview leaders was a key part of the preparation. Several medical schools stated they were changing curriculum. Many schools had no set medical humanities courses outside of one or two courses in professionalism or physician/patient relationship. The researcher looked for a commitment to the medical humanities either as a center or in the school's literature describing courses and in faculty titles. Many schools did not mention the role of technology in the classroom or clinical setting; this led the researcher to look specifically for schools with simulation labs, as that was used as an indicator that schools had invested in current technology.

Preparation of Material for Drew University's Internal Review Board

The researcher worked with the Associate Dean of the Graduate School to obtain the forms, ask questions and begin the process. The questions were submitted to the researcher's dissertation committee and to a clinical research faculty member for feedback and suggestions.

Data Collection Questions

Questions to be studied are:

1) What role did the leader play in bringing organizational and pedagogical change to medical school curriculum to embrace recommendations suggested in Cooke's and Macy's reports?

2) What does that model look like for integrating medical humanities into the curriculum?

3) How do the schools use technology to meet the recommendations in the Cooke report?

The answers to these questions will help to address how or if the model addresses student-centeredness, whether the model is replicable, how the change model includes social and cultural awareness to teach and deliver medical care, and whether the model is sustainable.

Guide for the Case Study Report

There are four steps guiding the case study report. The first is the dissertation, as this case study serves as the basis for completing degree requirements and offers new research to the field. The second step demonstrates the process of creating curriculum reform for that incorporates medical humanities and technology into the curriculum. The process portion allows for the third portion the identification of innovative practices to occur. The data that emerges proves the potential for publishing in medical education or medical humanities journals. Research on outcomes serves as a foundation for presentation at medical humanities conferences.

Selected Medical Schools for Case Study

The three schools in this study represent three different stages of reforming curriculum. The first school is an established school with a reputation for incredible scholarship but radically changed the structure of its curriculum in the late 1990s into the

2000s. The second school is an established school with new leadership pushing faculty and staff to change how it teaches future physicians in 2014. The third school is an established medical school, approaching its fiftieth year, committed to medical humanities as a core part of the curriculum and working to embrace new curriculum methods. The variations of constituency buy-in, overall support from school and governing agency, and role of the leader are discussed in this comparative case study.

Interviews were conducted with a lead person at each medical school, a president of the school or the vice deans of academic affairs or education. The interviews identified similarities and differences that allow for comparison of changing a set curriculum. The research focused on how the leader responsible for changing the curriculum and ultimately the paradigm worked to make the challenge a reality.

Research Design

The design of this comparative case study highlights the similarities and differences of three medical schools committed to investing in changing their curriculum through the lens of academic vice deans or school presidents. The data retrieved from the interviews provided strategies the leaders used to implement change at their respective schools. The findings provide examples not available in data collected through secondary sources. The information collected provides real-time descriptions as well as insights into each individual's leadership style to change existing models at each school. The research in this document tells the story of best practices for implementing change as it augments many suggestions made in secondary sources with the human element, thus allowing

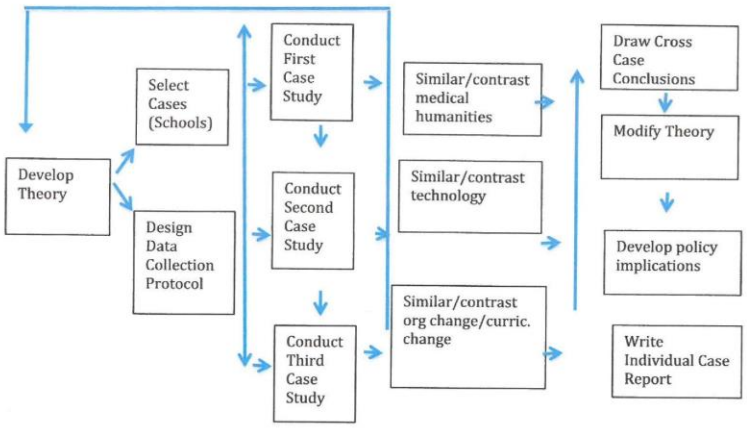
medical school leaders, members of the LCME, and other policy makers and legislators to understand the process and potential outcomes of reforming medical education.

Research Questions

The interview questions used for this study were both structured and unstructured for information to be gathered while allowing it to flow freely. The questions followed a continuity across the three schools, but created space to expand on key points regarding leadership, cross-disciplinary and inter-professional interaction, and integration of instructional technology, as all three schools had different interactions. Drew University's Institutional Review Board approved the questions.

The process of collecting material, and analyzing it, as well as reaching conclusions is illustrated in the diagram below.

Figure 3.3 Analysis and Conclusion; Understanding and Interpreting Data and Analyzing;
Define/Design/Interview and Data Collection



Adapted from Yin, *Case Study Research: Design and Methods*, 60.

The research in this study looks at 1) the process of creating curriculum change, 2) implementation of the model to incorporate new curriculum content and methodologies of delivering the content using humanities, and 3) how current technological tools are integrated to assist with attaining student-centered learning and social-cultural awareness as the 2010 Carnegie and Macy Jr. Foundations reports suggested.

While the three schools began the change process at different stages they allow for comparison as each addressed accreditation, leadership, pedagogical change, and cultural change within their respective organizations.

Data Collection

Existing literature from articles in professional journals as well as information available from medical schools' webpages and blogs were collected and reviewed. A review of policy and expectations from the four groups: LCME that governs medical school curriculum; USMLE given by the NBME; the MCAT, a program of the AAMC; and the ACGME.[96]

The researcher chose to interview vice deans of academic affairs and a president of a medical school, as a major part of their responsibility is to uphold curriculum accreditation and work with faculty to develop relevant curriculum. The three

[96] The LCME is recognized by the U.S. Department of Education as an accrediting agency for medical education programs leading to the MD degree. For simplicity, the LCME website contains references to "schools" instead of "medical education programs leading to the MD degree." Though references on the LCME website to "schools" are synonymous with "medical education programs," the distinction between programmatic accreditation vs. institutional accreditation is an important one. Institutional accreditation is granted by regional accrediting agencies and is required to qualify for federal financial assistance programs authorized under Title IV of the Higher Education Act. "About the Liaison Committee on Medical Education."

interviewees who participated in this case study analysis were specifically hired by their institution to change the curriculum. The president was chosen because he previously served as dean of a medical school, and he has been instrumental in changing medical school curriculum. Interviews with medical school deans of curriculum/academic affairs provided real-time insight into challenges and opportunities regarding change mechanisms and allowed for the observation of the integration of medical humanities and technology across the curriculum. The role of technology offers the opportunity to change the curriculum.[97]

The interviews were conducted in person and through phone conversations. The researcher visited each of the three schools. The interviews were recorded with the interviewee's permission using a tape recorder and taking notes. The recordings and notes are kept on a password-protected laptop.

In reviewing and reading the existing literature the researcher found each of the three schools is implementing change in similar ways and the humanities and technology play a role in the change of structure and content of the curriculum. This study looks at three schools that have a strong foundation in either medical humanities or technology in order to understand how they are being used in the undergraduate medical setting. The

[97] "Whitson and Amstutz (1997) suggest a number of strategies for dealing with the information and technology overload. First, adult educators should "build more and better connections with those who directly teach information access skills," especially librarians, but also computer specialists (p. 133). Educators can also focus on developing students' "higher-level thinking skills" so that judgments can be made about the credibility and usefulness of information (p. 137). Since much information is available electronically through the Internet and the World Wide Web, the authors underscore the need for educators themselves to become comfortable in this environment, to the point that they can help learners take advantage of technology. Sharan B. Merriam, Rosemary S. Caffarella, and Lisa Baumgartner, *Learning in Adulthood: A Comprehensive Guide* (San Francisco: Jossey-Bass, 2007), accessed Apr. 26, 2015, http://search.credoreference.com.ezproxy.drew.edu/content/entry/wileyla/the_social_context_of_adult_learning/0.

emerging topics are described in the following chapters.

Research Validity

Yin suggests four tests be done to ensure case study validity. He refers to these as "construct validity, internal validity, external validity, and reliability.[98] Yin suggests it is important to clearly define the change to be studied, so as not to lose the validity of the study. He suggests, "define the change in terms of specific concepts (and relate them to the original objectives of the study) and identify operational measures that match the concepts (preferably citing published studies that make the same matches.)"[99] The four tests serve to validate the research.

Construct validity requires "identifying correct operational measures for the concepts being studied."[100] In this case study, the researcher worked to identify how the variations in medical school curriculum created organizational change within departments and curriculum delivery.

Aspects linked to the change included how medical humanities and technology are considered in the change. The change in the curriculum could cause other courses or material to be delivered at different times, as the four year plan of courses at this time continues to build upon foundation set in other courses.

Step two requires creating a strategy to test the internal validity of the study. Yin points out the check for internal validity occurs after the completion of analysis as

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[98] Yin, *Case Study Research: Design and Methods*, 45-49.

[99] Yin, *Case Study Research: Design and Methods* 46.

[100] Yin, *Case Study Research: Design and Methods*, 46.

"pattern matching, explanation building, addressing rival explanations and using logic models," are indentifiable at this point.[101] The effect of changing the curriculum is a strategic one, as it influences the entire organization supporting medical education. Hence, understanding the strategy leaders employed correlated to the faculty development offered. The internal validity shows how the humanities and technology play a role in reforming undergraduate medical school curriculum to address the recommendations made in the Cooke and Macy Reports on aspects of how the humanities and technology are used as part of the mechanism to incorporate change emerge as strategies.

The third test is external validity. This test verifies if the research findings have analytic generalizations that others can use beyond the current study. Another way of looking at this is to look at the information to see how each site studied has themes that are reflected in each of the other sites. "The external validity can be tested by replicating the study and by using logic in a multiple-case study."[102] Each of the three schools is implementing change in similar ways and the humanities and technology play a role in the change of structure and content of the curriculum.

Reliability of the research is imperative for the case study's validity. The investigator demonstrates how the data has been collected and the questions asked in the interview may be reproduced to discover the same findings. The research process needs to be documented so it can be tested again, similar to laboratory studies. The results

[101] Yin, *Case Study Research: Design and Methods*, 48.

[102] Stephanie Koprowski McGowan, "Charter Schools Application, Funding, and Facilities: How Leadership Influences the Process in New Jersey" (EdD diss., Fordham University, 2013), 56, accessed Apr. 26, 2015, http://fordham.bepress.com/dissertations/AAI3552515/.

chapter has been structured to show the comparisons and contrasts of the elements studied: change, medical humanities, technology, and faculty development.

Interview Questions

The following questions were used in each interview:

1. Thank you for agreeing to this interview. I am wondering if you would share what your initial reaction was to my request to interview you. (Do you have any preconceived notions of this interview?)

2. As you have worked and written about medical school curriculum, would you describe how you come to terms with your ideal version versus the reality of today's curriculum? (Would you define your ideal vision?) What is your vision of medical school curriculum?)

3. Is your vision shaped by your own experience in medical school? or in teaching? or working with others? (How is that different from what you experienced as a medical student?)

   i. Or different from the school you currently serve?

   ii. You have been involved in curriculum change. How have you found cooperation among your peers? Would you define how that looks or strategies you have used?

   iii. Have you been surprised by any of your allies/opponents?

   iv. What advice would you have for people trying to make curriculum changes? (You recently changed your curriculum or are in the process. How did you go about it?)

4. Did you use an organizational change process? (By this term, I mean_____.) Do you agree with how I am describing cultural/structural change?

Follow-up: Do you think cultural/structural change has a place in pre-med, medical school, graduate, or continuing medical education?

i. If so which one? Why did you choose that one?

ii. If no, why not? What is your structure?

5. What are the challenges in changing or augmenting curriculum?

i. How do you work through any barriers to change? What strategies did you employ?

6. When you want to change curriculum how do you navigate the change knowing what challenges you may be facing?

7. What is the role of medical humanities in your curriculum? Do you see it as being able to intertwine with STEM suggestions, or do you think it should be taught as a stand-alone topic?

i. If yes, how do you define medical humanities?

8. How did you become interested in medical humanities? Did you have classes as an undergrad/personal interest/working with students/patients?

9. What is its importance in your curriculum?

10. Have you faced any opposition?

i. If so, what has it been?

ii. If not, were you expecting any and how did you accommodate for it?

11. How are you incorporating technology into the curriculum?

12. What challenges/opposition have you dealt with?

13. Your pioneering efforts and advocating for early exposure to clinical work and data analysis—are you incorporating medical humanities into any of the {basic courses} e.g. anatomy?

14. Is technology changing how you are teaching students to care for/diagnose patients?

    i. If so, how?

    ii. How is this different from when you went to medical school, in terms of preparing future physicians?

    iii. What do you hope comes from technology?

15. While many of your changes have been successful, how have you discovered alternative options or implanted things differently than anticipated? (Are there any voids you see in changing the curriculum?)

16. What does medical humanities/technology transition from 1st year to 4th year for residency look like? What have you found to be successful? (How has the theory into practice transition gone?)

17. How do you work to integrate medical humanities across your medical school? What is it that got you to embrace the notion?

    i. Are there senior clinicians that are regard to bringing about your vision for the curriculum?

ii. Are there senior clinicians who are not supportive of medical humanities in the curriculum? What affect does that have on students? On curriculum effectiveness, if any?

18. Are you integrating medical humanities and technology together or separately?

i. Why? Or Why not?

19. Are you familiar with the 2010 Cooke's or Josiah Macy reports?

i. If yes, has this influenced your thinking?

20. What inspires you to embrace change and/or innovate?

21. Have you used a specific model to bring about innovation? If yes, why did you choose this model? Any recommendations to others?

22. When you do change curriculum, what has been the institutional response? Faculty members? How have you responded?

23. Is there any issue I have not raised that you feel is important in regard to changing curriculum? To incorporating medical humanities or technology?

24. What advice would you give or recommendations would you make regarding incorporating medical humanities and technology, so they don't have to re-invent the wheel?

Chapter 4

RESULTS

This chapter examines how three medical colleges implemented change in their undergraduate curriculum to address issues of education reform, specifically student-centeredness, awareness of social-cultural issues as they relate to health and medicine, and use of technology in course work as recommended in the Carnegie Report released in 2010.[103] The chapter looks at three facets the medical colleges used to reform their curriculum: 1) medical humanities, 2) technology in the curriculum and 3) how the organization planned the transition to incorporate faculty and staff participation and development. The results of examining the three facets are discussed under the headings of "content" (what is taught) and "methodology" (how it is taught).

A comparative case study methodology based on Robert Yin's work was used to conduct the analysis of the three undergraduate medical schools.[104] This research methodology evolved into a multi-case study. The triangulation of research consisted of reviewing collateral materials published by the school; site visits to all three schools, and interviews with three school leaders—two vice deans of education and one university president who previously served as dean of a medical school. The three interviewees were familiar with and responsible for overseeing curriculum change at their respective schools.

[103] Cooke, Irby, and O'Brien.

[104] Yin, *Case Study Research: Design and Methods*, 237.

The three schools were selected after reviewing articles regarding medical school curriculum reform. The schools were selected for relevance, not randomly. Those articles led to undergraduate medical schools that were innovating new ways of delivering content, thus suggesting best practices. A review of the schools' websites and collateral materials provided background and contact information. An email was sent to school leaders requesting an interview. The three schools discussed in this study were chosen as they were receptive to site visits and interviews. Each school was visited; the visits included observations of faculty offices and classroom spaces, including large lecture-style rooms and small group rooms. The small group rooms varied at each school: one had no technology in the room outside of a signal for internet, another had two way mirrors for observation and cameras for taping and reviewing learning sessions, and the third had options for either no apparent technology or the ability to have cameras brought in. Other areas observed included student areas, including lounges, and bulletin boards and posters presenting student work. The site visits were an important component of this study, as they allowed the researcher to see if that what was observed was accurately reflected in the literature the university produced. The site visits allowed for observation of two of the three schools' simulation labs: both were in use at that time via formal classroom and students practicing on their own.

Interviews with two vice deans of education and one university president were conducted via telephone as weather, rain and snow storms prevent the intended in-person interviews. The three representatives answered the same set of questions. The questions were approved and sanctioned by Drew University's Institutional Review Board.

A key aspect of the study focused on leadership, pedagogical change, and cultural change. While important as independent variables for the type of change discussed in this research, the three variables are co-dependent. They are all interconnected. Because there are many exemplary medical humanities courses as electives at medical schools, the only way to examine how integral the medical humanities are to the medical school institutional curriculum was to look at who are the change agents who can make a structural difference. The focus of this study centered on deans of medical schools, specifically vice deans of education. They are the ones in charge of changing curriculum and making sure the curriculum is in keeping with accreditation standards. At School Two, the vice dean inherited a new curriculum, but spent months encouraging faculty to look at accreditation standards. The change factor is important as faculty look at what they want to do, but deans have to think about accreditation and overall goals of the institution.

Pedagogical change is tied to leadership and culture. School Three is a Steve Jobs model in which it is acceptable to propose to throw everything out and start over. The theory is very freeing, but one has to realize that the same people who have been doing the work are now being asked to change how they are teaching and delivering materials. This approach requires clarity and support.

School One has really thought about the effect of organized change on staff and faculty. There was a clear understanding of needing to have goals, vision, and human resources support of recognizing employees who have their individual goals. School One was keyed in to working with staff and faculty on synchronizing individual goals with the organization's goals.

Prior to discussing content and methods it is important to understand the role technology has within the medical curriculum change. The vice dean of education at School One offers a clear description that is applicable to all three schools. He describes three constructs to show how technology affects curriculum and curriculum planning. "1) Technology that enables the curriculum to be delivered; 2) Technology to be used for instructional purposes; and 3) Technology that assists in clinical practice and therefore students need to learn and utilize."[105] He points out that all three components of technology contribute to student learning, and all are equally important. This definition serves as the basis for reviewing curriculum integration in the three schools.

The chapter begins with a brief description of the three schools studied. The three schools, located in different areas of the country, are committed to providing their students with the tools to be successful physicians in the twenty-first century.

Brief Description of Schools

School One

School One, established in the late nineteenth century on the West Coast, has been known as one of the top research-intensive medical schools in the country from the later twentieth century through today. In the later twentieth century the school began to change its curriculum to adapt to new scientific knowledge and practices. "These changes led to new course content, reduced lecturing hours, thus allowing for an increase in small-group instruction."[106] In preparing for the twenty-first century, the state legislature

[105] School One administrator, interview by author, Dec. 15, 2014.

[106] Curry.

created mandates changing how the school accepted students.[107] At the same time the LCME "held its accreditation review and cited the school for lack of curriculum oversight."[108] These factors served as the impetus for revising the curriculum. The school developed a new curriculum model in the year 2000. The 2000 model serves as a benchmark for many medical schools looking to move away from lecture style toward small group formats as well as incorporating varying aspects of technology into the learning environment.

According to School One's admissions webpage, it accepts roughly 140 students per year based on interviewing 500 applicants per year. The school accepts a wide variety of students with majors in various disciplines. However, students with non-premed majors must complete required sciences. This school is located in a major urban area. Its curriculum is intentionally focused on small group work. Clinical training sites include the school's medical center hospitals, city's general hospital, and a Veterans Administration medical center. The various clinical locations represent a diverse, multi-lingual clientele. Students and residents may also train at other community-based hospitals in the region. This option provides trainees the opportunity to explore various care settings as well as understand how each clinic has its own aesthetic.

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[107] "In the early 1990s there was a push throughout the nation to achieve a 50/50 balance between training primary care and non-primary care physicians. In 1994 the University of California (UC) and the state of California entered into a Memorandum of Understanding (MOU) to address this problem. The primary goal of the MOU was to establish by 2001 at least a 50/50 primary care to non-primary care distribution of resident physicians, and to substantially increase the number of family practice positions "toward a goal of approximately 20 percent" of all UC residents." Marlene Garcia, Background Paper: The University of California's Compliance with the 1994 Memorandum of Understanding to Increase the Number of Primary Care Physicians Trained in California," Senate Office of Research (California), May 2005, accessed Apr. 26, 2015, http://sor.senate.ca.gov/sites/sor.senate.ca.gov/files/The%20University%20of%20California's%20Compliance.pdf.

[108] Curry.

School Two

School Two, located in the Mid-Atlantic, was founded over fifty years ago, and is the youngest school in this study. A foundation approached the university with the offer of funding to build a medical school, research center, and teaching hospital.[109] The founding dean of the medical school believed in the importance of humanities in medical education. He is quoted as saying he wanted to produce "doctors with handbags and a heart."[110] The school was founded with the intent of using medical humanities across the curriculum. The school has a fifty-year record of using problem-based learning and humanities, thus making it unique among medical schools.

When the school opened students were offered a choice in the type of curriculum to participate in: either an all problem-based learning in their first two years or lecture format. At some point, due to accreditation recommendations, that option was removed and now all students participate in a hybrid curriculum format of problem-based learning and lecture. After three years of planning, School Two implemented a new curriculum in July of 2013.

The medical school receives over 8,000 applications a year and invites roughly twelve percent to interview. The school is highly selective and accepts 145 students a year.[111] It accepts students with both pre-med and humanities backgrounds. The school selects students not only on academic success but on their "potential for professional growth, contribution to the broad diversity of the student body, commitment to serving

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[109] http://www._____.org/web/guest/home/aboutus/history.

[110] English, Teri. http://www._____.org/web/alumni/english-family.

[111] http://www._____.org/c/document_library/get_file?uuid=f8fc47f1-8474-4926-a9a5-066ad1b00d7c&groupId=10100.

special needs in health care, and capacity for developing into competent, dedicated, and caring physicians."[112] The selection process emphasizes the school's founding vision of medical humanities.

The medical school serves a socio-economically diverse population, as it is a regional level-one trauma center for both pediatrics and adults. The community has a population of 13,876 people and is located twenty miles outside of the state's capital city. The regional industries are factory, farming, and tourism. According to the school's website, clinical training sites include the local medical center and a student-run clinic. The student-run clinic, housed in a non-profit facility located in the state capital, sees over 2,000 patients a year.[113]

The current vice dean of education arrived in February of 2013 with the expectation to launch the new curriculum four months later. There had been a leadership change during the curriculum development phase with the previous vice dean leaving and a person serving as interim vice dean. When the current vice dean arrived, there were four months to curriculum launch, so decisions were made without much time for group process. The vice dean relied on the material and curriculum recommendations, but the overall design was not hers to implement; she had to adapt to the curriculum.

School Three

School Three, established in the nineteenth century in the Northeast, has a strong reputation for its medical discoveries and advancements. Conversations regarding

[112] https://www2.med.___.edu/mdadmissions/admissions/application-process/.

[113] https://www2.med.___.edu/mdadmissions/admissions/application-process/.

developing a new curriculum began in 2012 as the last curriculum update occurred in the year 2000. The tradition of the school coupled with a recent large philanthropic gift has positioned it to rise to the challenge of maintaining its stature in medical knowledge and advancement. Current leadership encourages intra-professional interaction among staff and faculty while pushing for change in how the medical school functions.

According to the medical school's webpage, it receives over 10,000 applications and accepts 255 students a year. Admissions seeks candidates who are able to respond to situations and communicate effectively while applying their knowledge so decisions are not solely focused on high GPAs or pre-med backgrounds. The admissions webpage states the school looks for applicants interested in life-long learning. The school and its health centers serve a diverse urban population.[114] Medical students work with patients in the university clinics and hospital system.

The school's new president arrived in the summer of 2013 and was charged with redesigning several aspects of how the school works. He hosted several town hall meetings and worked internally with the entire staff on creating a plan for organizational change by setting the expectation that everything could be reimagined.

The school is currently undergoing a curriculum change and changing the structure from lecture format to small group work and problem-based learning. The president stresses medical humanities offer a way to break away from the science-heavy curriculum to integrate necessary components for practicing medicine in the twenty-first century.

[114] School Three's admissions webpage, accessed Jan. 25, 2014.

Comparison on Dimensions of Similarities

This section explores the similarities among the three schools in regard to the role of the three facets studied: medical humanities in curriculum reform; how technology is used in the curriculum; and how curriculum change was integrated through an organizational change process. Each of three areas is described under the headings of content (what is taught or implemented) and methods (how it is taught or implemented).

Integration of Medical Humanities in Curriculum Reform

All three schools are committed to the importance of medical humanities in their curriculum, yet are integrating the humanities in different ways. Two of the three schools have an active Medical Humanities Department. The faculty in the department also serves as faculty in other departments; this helps to build a broad consensus and build support among other medical faculty who may not be as familiar with the humanities. One school currently has plans to create a Department of Humanism. The root of the word *humanities* is human or humane. The integration of medical practices that implement or deliver services in a way that is humane or is understood in that way positively affects both the giver (medical professional) and the receiver (patient). This is at the core of how the concept of medical humanities is successfully integrated in medical curriculum, not as a separate curricular component but as integrated into every phase of education and ultimately into delivery.

Content Similarities

The content section shows the similarities of how the medical humanities are incorporated into each school through departments and courses. Two of the three schools have a department of humanities focusing on content of medical humanities courses as well as offering extra-curricular programming in the way of lectures, book discussion groups, or other aspects of the humanities. The content section has two subheadings, medical humanities department and course content. All three schools currently have a required course for medical students in Year I and in Year II that focus on the expectations of the profession of doctoring that include ethics, communication, and the sanctity of the physician/patient relationship. The three medical colleges also offer extra-curricular events and programs focusing arts and humanities as part of the art of medicine.

School One

Department of Medical Humanities

The school has a department of medical humanities. The intent is for medical humanities to be integrated across and through the curriculum, but it has not reached that goal. Medical humanities were part of the behavioral science goal in the curriculum rolled out in the year 2000. The humanities are incorporated into the curriculum at different levels given the faculty member's area of interest. Many medical faculty members are also part of the medical humanities department, so the medical humanities are integrated in an interdisciplinary manner. The humanities may come up in problem-based learning assessments. One faculty member said, "Students are asking for more art depicting

specific diseases they are studying so they can understand the historical applications."[115] Again, as student-centered learning and technology ingratiate into the medical learning environment there are more potential applications.

Courses

School One formerly referred to medical humanities as behavioral science or professionalism. The medical school teaches courses in professionalism. They define professionalism as:

> The development of the values, behaviors, feelings, disposition of being a physician. This has become much more of a focus, it is driven in part by many people feeling physicians fail to have ethics, values, commitment to patient centered care, communication abilities, established rapport, and to see themselves as in service to the patient as opposed to advancing their own careers. So a lot of work is going into finding ways to engage students and residents to think about and reflect on their own experience and the ethical dilemmas they face. And providing them with the negotiation skills to be able to work through the conflicting or conflicted encounter among services with patients and their families. It's a very difficult environment in which to work. Physicians need to be taught the skills in which to negotiate successfully. [116]

There are several medical narrative courses focusing on medical narrative providing "training in narrative craft skills, critical reading of a range of public medical writings, and mentorship in the drafting and revision of one or more works for submission to a journal, newspaper or magazine."[117] There is a course called Medicine to Create Change that "explores social, political, and behavior factors that affect the health

[115] School One faculty member, interview by author, Dec. 12, 2014.

[116] School One faculty member, interview by author, Dec. 15, 2014.

[117] http://medicalhumanities.____.edu/courses.

of individuals as well as opportunities for health care providers to impact both individual patients as well as larger communities."[118] There is also a Physician as Writer course. One course called Practicing Humanism in Medicine is explained as: "No standard script exists for the humane practice of medicine or nursing. Students learn and practitioners maintain this art only by a constant reawakening of humanistic values."[119] School One provides a variety of ways the humanities are incorporated to explore the pursuit of medicine.

School Two

Department of Medical Humanities

School Two was founded with the expectation of using the humanities to teach medicine. The school's medical humanities department is over fifty years old. All medical students take humanities courses throughout their time in medical school. The department plays a key role in the medical school's overall curriculum planning.

Courses

All medical students take humanities courses throughout their time in medical school. School Two integrates medical humanities in various ways. One example of technology used for instructional purposes is adapted from a model used at University of Arizona medical school where medical students interview patients and their families using a digital video recorder to begin to understand what it means to live with a chronic

[118] http://medicalhumanities____.edu/courses.

[119] http://medicalhumanities.____.edu/courses.

illness or disease, and to see how patients adapt their living environments.[120] Medical students come away from the project with a greater understanding of how the scope of the diagnosis affects the patients beyond the exam room.

Course examples include students taking the Medical Humanities course in their first year. Discussions and course content revolve around "questions of value and meaning in and around medicine including; the patient's experience of illness; social and cultural contexts of sickness and healing; historical development of the medical profession; relationship of the medical profession to society; and moral dimensions of the physician-patient relationship."[121]

Students in their second year are required to take a course titled "Ethics and Professionalism." The course goal is to introduce "students to a variety of ethical problems that arise in the practice of medicine, as well as preparing them to deal effectively with such issues in a professional manner."[122] Students are exposed to the humanities through their medical school career, as faculty include aspects of the humanities in course work.

School Three

Department of Medical Humanities

School Three recently proposed a Center for Humanism in Medicine. On its development page it states, "The goal of the Center for Humanism in Medicine is to

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[120] "DOC," The Arnold P. Gold Foundation, Nov. 2008, accessed Apr. 26, 2015, http://humanism-in-medicine.org/images/DOC_2008_November.pdf.

[121] http://www._____.org/web/md/curriculum/overview/firstyear.

[122] http://www._____.org/web/md/curriculum/overview/firstyear.

enhance and expand how bioethics and the medical humanities are currently taught ensuring that compassion in medical care will always be a priority at [the school]."[123] The website states its "educators promote humanism in medicine through teaching the principles of bioethics: patient autonomy, patient welfare, beneficence, non-maleficence, social justice, honesty and confidentiality."[124] The website explains, "These principles are built into the classroom curriculum and into the students' clinical encounters working with physician role models in their everyday care of patients."[125] Bioethics is an important aspect of humanism; it is not the total sum of medical humanities. The school recognizes more aspects of the humanities need to be incorporated into core classes:

> Other subjects in the medical humanities – the visual arts, cinematography, music, philosophy and the history of medicine – receive less attention in the curriculum as these disciplines compete for time with the foundational courses in the biomedical sciences. These foundational courses are vital to the evidence-based practice of medicine and will remain as core curriculum components; however, there are many potential opportunities to enrich the students' learning experience with more coursework in the humanities.[126]

School Three's plan to create the center demonstrates a commitment to expanding the medical humanities from the current extra-curricular level of joining a book

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[123] School Three president, interview by author, Feb. 14, 2015. Interview with president of School Three, 2/14/15; http://advancement._____.edu/s/1399/index.aspx?sid=1399&gid=1&pgid=1216&cid=2986&ecid=2986&crid=0&calpgid=1212&calcid=2982.

[124] School Three president, interview by author, Feb. 14, 2015. Interview with president of School Three, 2/14/15; http://advancement._____.edu/s/1399/index.aspx?sid=1399&gid=1&pgid=1216&cid=2986&ecid=2986&crid=0&calpgid=1212&calcid=2982.

[125] 2012 course catalog, http://www._____.edu/content/dam/tju/jmc/files/Catalog2012.pdf; http://advancement._____.edu/s/1399/index.aspx?sid=1399&gid=1&pgid=1216&cid=2986&ecid=2986&crid=0&calpgid=1212&calcid=2982.

[126] http://advancement._____.edu/s/1399/index.aspx?sid=1399&gid=1&pgid=1216&cid=2986&ecid=2986&crid=0&calpgid=1212&calcid=2982.

club discussion, attending the Dean's lunch time music series, or going to other visual or audio art-based institutions which host special events for medical students toward an integrated part of how medicine is taught.

Courses

There are two required classes in Year I and II called Introduction to Clinical Medicine. According to the school's website the course provides students with the skills "to function skillfully in our evolving health care environment, as a clinician and as an integral part of the health care team. Topics include professionalism, medical ethics, system-based care, medical informatics, evidence-based medicine, cultural diversity, behavioral science and clinical skills."[127] In Year II, students conduct standardized patient interviews and receive feedback on their communication skills. "During clinical skills sessions, students have the opportunity to examine patients with abnormal physical findings and learn about the clinical presentations of various disease processes."[128] The course design includes both small group discussion and teaching history taking and physician/patient communication in the classroom as well as clinics, offices, and hospital settings. The course catalog does not describe these courses as medical humanities; aspects of the humanities are embedded in at least two of the core classes.

[127] http://www.aboutmedicalschools.com/medicalschool/_____ -university/.

[128] http://www.aboutmedicalschools.com/medicalschool/_____ -university/.

Table 4.1 Content Similarities in Medical Humanities (MH) Curriculum

Column1	MH Department	MH Core Content in first two years	MH Extra Curricular Activities
	MH Department	MH core content	MH Extra Curricular
School One	x	X	x (lectures, journal, musical performances)
School Two	x	X	x (lectures, drama group, journal, films, musical performances)
School Three	in process of funding	X	x (lectures, art tours, musical performances)

Methods Similarities

While each school designs and delivers its content differently, the three schools recognized large group lectures are no longer effective means for disseminating information or for retaining information. The call for student centeredness and social cultural awareness has led schools to look at pedagogical models that support active learning. There are three curriculum models all three schools have in common allowing for active learning and integration of medical humanities material. The models are problem-based learning (PBL), interprofessional education (IPE), and pathway programs and the similarities of how each school uses the three curriculum models are explained in this section.

Specific avenues for shifting course material from didactic learning include case studies, and small group discussions and problem-based learning, PBL curriculum incorporates case studies and small group discussion while focusing on teaching students how to problem-solve, work in teams, and to adapt as new information becomes

available.[129] Thus PBL begins to model the ideal of how healthcare teams work.

IPE offers a way to teach students from all healthcare professions how to work in an inter-disciplinary team-based environment, providing a contextual basis for classroom and real-world situations. Traditionally, each healthcare profession was taught in different venues and by different instructors as each field learned the specific skills their profession required. As healthcare moves toward team-based delivery it important to train all professions together at specific times to begin to develop the sense of team as well as appreciation and understanding of specific skills of individual team members.

Two schools have used IPE with their nursing schools. All three schools are still working on expanding their programs to include medical students and healthcare professionals as time schedules and physical locations have provided obstacles in the past. All three schools use IPE with first-year medical students. School Two circles back to IPE in year four with discharge planning scenarios. This methodology will continue to grow as the results show success and with intentional structural changes to accommodate the varying healthcare school course structures.

Pathway programs focused on avenues of medical humanities are offered at two of the schools. Pathways are not unique to medical humanities as several schools have

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[129]In the PBL learning process learners encounter a problem and attempt to solve it with information they already possess allowing them to appreciate what they already know. They also identify what they need to learn to better understand the problem and how to resolve it. Once they have worked with the problem as far as possible and identified what they need to learn, the learners engage in self-directed study to research the information needed by finding and using a variety of information resources (books, journals, reports, online information, and a variety of people with appropriate areas of expertise). In this way, learning is personalized to the needs and learning styles of the individual.

The learners then return to the problem and apply what they learned to their work with the problem in order to more fully understand and resolve the problem. After they have finished their problem work the learners assess themselves and each other to develop skills in self-assessment and the constructive assessment of peers. Self-assessment is a skill essential to effective independent learning.

"What Is Problem Based Learning (PBL)?," Department of Medical Education, SIU School of Medicine, accessed Dec. 19, 2014, http://www.siumed.edu/dme/PBL-overview.html.

them; they are called pathways or scholarly pathways and many schools offer them as a part of a joint degree, e.g. MD/MPH; MD/MBA, etc.[130] Pathway programs require a three to four year commitment to studying a topic in-depth while in medical school. Students receive mentoring and development in that particular area. 2010 Carnegie authors point out "In terms of pedagogy, the key for these scholarly projects is strong advising, guidance, mentoring, and feedback."[131] They further point out a few schools have developed pathways or scholarship projects that go beyond lecturing and mentorship as they include "learning experiences in which students interact with the members of a community, be they health policy activists, research scientists, or aficionados of medicine and the arts whose interests connect to the student's project."[132] They are discussed in this section to showcase how two of the three medical schools are using Pathway programs to teach medicine using aspects of the humanities.

The similar ways the three schools implement three methods (PBL, IPE, and Pathway programs) for integrating and teaching course material is explained below.

School One

The first step in changing the curriculum format required moving from lecture

[130] While many schools offer joint degrees and scholarly pathways, not all schools are working to separate classroom and clinical time periods. For example, the University of South Dakota offers scholarly pathways still has its curriculum structured in the traditional 2+2 format. "M.D. Program," University of South Dakota, 2015, accessed Apr. 26, 2015, http://www.usd.edu/medicine/md-program. Another example is Brown University where they include scholarly pathways in addition to pre-existing curriculum. "Scholarly Concentration Program," Brown Alpert Medical School, accessed Apr. 26, 2015, http://brown.edu/academics/medical/education/scholarly-concentration-program.

[131] Cooke, Irby, and O'Brien, 98.

[132] Cooke, Irby, and O'Brien, 98.

style classes to small group discussion format. School One decided, "fifty percent of teaching had to occur in small groups via discussion, not lecture."[133] The decision to move from lectures toward small group discussions required reframing how teachers teach and how students learn. The curriculum design was constructed and "built on the premise that students who play an active role in their education emerge with deeper knowledge, better skills, and a clearer sense of how they want to practice medicine."[134] Classes are formatted via small group discussions where students determine what they need to learn given the objectives of the course.

This change of power dynamic in the classroom of faculty as keepers of information to faculty as key facilitators of learning meant working with faculty to rethink and redesign how they deliver course material. The developmental work in changing the curriculum was done over a two-year period of faculty and staff working together in various work groups and committees to reimagine the medical school curriculum.

Problem Based Learning

PBL in terms of medical humanities content resulted from students asking questions around the humanities content in given cases. As one medical professor stated, "The predominance of PBL in the classroom is the way to go given all [the information] all medical students can access faster than we can ask the question. I don't think we

[133] School One administrator, interview by author, Dec. 15, 2014.

[134] School One's admissions website, accessed Jan. 31, 2015, admissions/degrees-and-programs.

should be focused on knowledge transfer."[135] He went on to point out "that all of higher education is forced to reassess and to evaluate what we do when we're face-to-face with learners in the classroom."[136] He further advocated PBL lets students work in teams, using collaborative skills as that is how learning exchanges really work and is how medicine will be practiced in the near future.

Pathways

A key to changing the format of the 2+2 is integrating competencies. School One developed a variety of pathways students can pursue to continue their passion for excellence and career trajectories in addition to just becoming a physician. They offer health professions education, global health science, molecular medicine, clinical and translational research, and a health advocacy/leadership pathway called Health and Society. "These pathways run into residency programs, so students and residents may work together in these areas of scholarship. That is part individualization model."[137]

School One intentionally expects their students to pursue a pathway as a way of further developing students as physicians and individuals. The pathways offer a humanities point of view; training another aspect of the physician's senses provides for greater observational and experimental methods of social science skills to "examine and

[135] School One faculty member, interview by author, Dec. 12, 2014.

[136] School One faculty member, interview by author, Dec. 12, 2014.

[137] School One faculty member, interview by author, Dec. 12, 2014.

predict behavioral and organizational processes. Together they help us understand what it means to be human and connect us with our global community."[138]

The medical humanities are taught through School One's Pathway—Health and Society. The goal of the Health and Society Pathway is "to advance health by engaging society; such as health disparities, policy, social and behavioral science, leadership and advocacy, community engagement."[139] The Health and Society pathway encompasses aspects of the humanities through ethics, social and cultural awareness using aspects of medical anthropology and sociology.

Interprofessional Education

The integration of medical humanities at School One continues as a work in progress as faculty and students exchange ideas and work their way together in PBL, IPE, and technology integration. Inquiry improvement is a form of leadership development that encourages people within an organization to focus on what is working, why it is working, what allows for it to work, etc. It is similar to Appreciative Inquiry (AI), a leadership development method that grew from the work of David Cooperrider, a professor at Case Western's School of Management.[140] Essentially a group of questions

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[138] Commission on the Humanities and Social Sciences, *The Heart of the Matter: The Humanities and Social Sciences for a Vibrant, Competitive, and Secure Nation* (Cambridge, MA: The American Academy of Arts and Sciences, 2013), accessed Apr. 26, 2015, http://www.humanitiescommission.org/_pdf/hss_report.pdf.

[139] http://meded.____.edu/pathways/____-electives-coded-pathway.

[140] Peggy Holman and Tom Devane, *The Change Handbook: Group Methods For Shaping the Future* (San Francisco: Berrett-Koehler Publishers, 1999) includes a chapter about AI. In 2003, a book on AI was published, with the second edition released in 2008: David L. Cooperrider, Diana Kaplin Whitney, and Jacqueline M. Stavros, *Appreciative Inquiry Handbook For Leaders of Change* (Brunswick, OH: Crown Custom Pub, 2008).

are asked to understand and identify what the organization does best, recognizing weaknesses that do not allow for human growth but perpetuate downward spiral. There are four steps in the process. School One focuses on creating practices based on inquiry and improvement. As the vice dean describes it,

> One way to think of this is that everyone has two jobs. The job they are paid to do, and then they have the job of improving that job. So when students get out and begin to practice, they have the job of providing service but they also have the obligation to improve the quality and safety of that service.[141]

The school works to constantly update, revise, and increase expectations of students and faculty. One example is IPE, even though it challenges each profession's identity formation notions. "It's good work, important work, we are sort of in the front end."[142] Working to improve quality means bringing all members of the healthcare team together and encouraging team formation.

School Two

The process for understanding School Two's medical humanities integration begins with the architecture of the building. The founding dean strongly believed medical humanities belonged at the core of the medical school. The main school building was designed in the shape of a crescent, symbolizing embracing people and ideas. The interior of the medical school and medical buildings are full of greenery and seating areas to establish intimate aesthetics versus clinical aesthetics and to connect the outside world with the clinical world. The idea of nature and wellness is now being retrofitted into

[141] School One administrator, interview by author, Dec. 15, 2014.

[142] School One administrator, interview by author, Dec. 15, 2014.

many medical settings.[143] The founding dean understood the importance of connecting learning and healing with elements of the natural world.

While architectural and interior design play a key role in aesthetics, the medical school exposes students to medical humanities courses throughout the medical school experience. The medical school space was designed to accommodate both lectures and small group formats.

School Two changed its curriculum to prepare students to practice medicine in the twenty-first century. The "curriculum is designed to reinforce the enduring tenets of the practice of medicine and address the broad and changing healthcare needs of society."[144] The focus on the curriculum is both learner-centered and patient-centered.

The schools format is a modified 2+2 model, as students do have clinical exposure in the first two years. The humanities as part of the core curriculum has continued to serve as a focal point for providing real-world context to current medical situations. Culturally the humanities have been part of the school's core. The pillar design allowed the vice dean and the chair of humanities to expand how the humanities are integral to create a longitudinal development over the seventeen months of coursework prior to the clerkship.

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[143] Alicia Caramenico, "How Hospitals Can Use Nature to Improve Care," Fierce Healthcare, Jul. 8, 2013, accessed Apr. 26, 2015, http://www.fiercehealthcare.com/story/how-hospitals-can-use-nature-improve-care/2013-07-08; Roger S. Ulrich, "Effects of Interior Design on Wellness: Theory and Recent Scientific Research," *Journal of Health Care Interior Design* 3 (1991): 97-109, accessed Apr. 26, 2015, Major Hospital Foundation, http://www.majorhospitalfoundation.org/pdfs/Effects%20of%20Interior%20Design%20on%20Wellness.pdf.

[144] Ulrich.

Problem-Based Learning

Since its inception, School Two has used PBL to develop critical-thinking skills necessary for clinical reasoning and problem solving.[145] PBL promotes communication, professionalism and teamwork. "Students learn to research and present evidence-based articles and use SNAPPS as a technique for clinical case presentations."[146] SNNAPS consists of six steps: (1) Summarize briefly the history and findings; (2) Narrow the differential to two or three relevant possibilities; (3) Analyze the differential by comparing and contrasting the possibilities; (4) Probe the preceptor by asking questions about uncertainties, difficulties, or alternative approaches; (5) Plan management for the patient's medical issues; and (6) Select a case-related issue for self-directed learning.[147] PBL classes are incorporated into all organ-system courses and help students learn how to begin to look for symptoms, learn to ask questions and how to begin to diagnose issues patients are presenting.

Pathways

School Two does not have a pathway program, as its medical humanities curriculum is integrated through the four years of medical schools.

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[145] School Two faculty member, interview by author, Feb. 9, 2015.

[146] http://www._____.org/web/md/curriculum.

[147] T. M. Wolpaw, D. R. Wolpaw, and K. K. Papp, "SNAPPS: A Learner-Centered Model For Outpatient Education," *Academic Medicine* 78, no. 9 (2003): 893-98.

Interprofessional Education

School Two has been using IPE with its fourth year nursing students and first year doctors via a program initially funded through the Josiah Macy Jr. Foundation. The goal of the curriculum focuses on understanding and working toward improved safety and quality of service for patients. As nursing students and medical students are taught material in different ways and through different perspectives, bringing the two groups together begins to create a level of understanding of each other's roles in the healthcare team and fosters the development of communication, thus exemplifying the recommendations for IPE as stated in the 2010 Carnegie Report.[148] The vice dean pointed out: "nursing students have courses at different location, but come [to this campus] for the clinical portion of their education."[149] She went on to explain a current pilot program that brings together a team of students from interprofessional disciplines including medical, social work, physician assistants, and nurses, prior to a patient's discharge to create care plans.[150] The students work together on discharge plans for patients provide another way of allowing members of the team to communicate concerns and foster interprofessional communication.

Recently the University began a Physician Assistant program, and the curriculum design includes IPE. The students come together with medical students for specific aspects of professional medicine. "The medical students and PAs begin with a two-week course on health-systems, resilience, leadership, and teamwork, where students learn

[148] Cooke, Irby, and O'Brien.

[149] School Two administrator, interview by author, Mar. 2, 2015.

[150] School Two administrator, interview by author, Mar. 2, 2015.

clinical reasoning and hopefully continue to engage in aspects of life-long learning."[151] The vice dean explained that PA students also join medical students for abdominal dissection and work with each other as a dissection team. "At the point in the curriculum, the PA students have had more anatomy than medical students—so the power dynamic shifts."[152] The longitudinal expectation for the shared learning will allow medical students to understand the team concept of each person having a strength to contribute to the team's success.

Pathways

School Two does not have a pathway program tailored to pursuing an avenue of medical humanities as the humanities are offered all four years of medical school in course work and extra-curricular activities. However, in the Spring of 2015 School Two did begin a pathway program in Research, so it may be possible in the future for students to conduct humanities-focused research as part of a medical project.

School Three

The president worked closely with the dean of the medical college to restructure the curriculum committee and to realign its vision with the organizational vision. He points out committees are necessary but need to innovate and it is important to choose members who want to change. The president describes the current curriculum as "a hybrid, with way to many lectures, first two years is with patient mentors, simulations,

[151] School Two administrator, interview by author, Mar. 2, 2015.

[152] School Two administrator, interview by author, Mar. 2, 2015.

and interprofessional education."[153] He challenged the faculty to throw out the curriculum and think outside of the box.

The school's format is a modified 2+2 model, as students do have clinical exposure in the first two years. The humanities as part of the core curriculum is the goal of the president and dean of the school, but has not been a focal point thus far, as clinical sciences have been the predominant focus. The goal is to move away from large lecture format toward student-centered learning.

Problem-Based Learning

The art studies courses complements the schools charge to employ PBL to further demonstrate observing and listening techniques. The PBL helps students absorb, process, and form a thoughtful opinion to form a diagnosis. "Turns out it takes students with emotional intelligence to use smart technology. Why? That's the beautiful paradox: As computers do skill-based tasks, it actually takes empathy to work with patients and colleagues to allow that technology to transform our teams and our care."[154] The school has a nearly twenty-year history of incorporating PBL in some aspect of its curriculum. Several faculty leaders from all departments have supported the use of PBL to teach students the importance of critical thinking as the continuing emersion of medical information requires students to assimilate and question their decisions.

[153] School Three president, interview by author, Feb. 14, 2015.

[154] http://leadership._____.edu/2013/11/11/how-academic-institutions-must-lead-the-transformation-of-health-care/.

Pathways

School Three provides students with opportunities to participate in a pathway program. The school's "College within the College Scholarly Concentrations Program" provides highly motivated students with academic opportunities outside of the traditional medical curriculum. This program offers two choices: Population Health (emphasizing Public Health, Global Health and Community Medicine) and Clinical-Translational Research. These pathways incorporate some aspects of the medical humanities, but not as an intentional focal point. The webpage explains the expectations for participation in the pathway program. "This 3.5-year co-curricular program places emphasis on longitudinal mentored relationships, group seminars/courses and scholarly work."[155]

The pathway structure, while patterned after the 2+2 model, shows the potential for restructuring the content to become student-centered. A new model was announced in early 2015, allowing students to study in England and in the United States. The partnership is "designed to allow students to prepare for 21st century global health challenges via exposure to both U.S. and U.K. health systems during their program."[156] The foundation is in place to alter the content to use more aspects of the humanities to teach medicine.

[155] 2012 course catalog, http://www._____.edu/content/dam/tju/jmc/files/Catalog2012.pdf.

[156] http://www._____.edu/university/news/2015/01/21/_____university-partnership.html.

Interprofessional Education

The IPE model focuses on student-centeredness and student engagement. The school's president discussed a recently obtained grant designed for students to receive feedback from patients who serve as patient-mentors to students.[157] The IPE program allows students from medical, nursing, and pharmacy to work with patients who serve as mentors to the students to provide timely feedback about the physician/patient interaction from the patient's point of view. "The shared learning contributes to a greater appreciation of the value this integrated treatment approach has to the patient."[158] School Three has a long history of using IPE with its nursing and pharmacy students, and it is in the early stages of creating IPE experiences that include medical students. The president expressed hope that the patient-as-mentor pilot program build support for increasing this into the overall medical curriculum with faculty and staff in the medical college.[159]

Table 4.2 Methods Similarities in Medical Humanities Integration

	Small Group as Primary delivery method	Problem-Based Learning	Interprofessional Education	Pathway Programs
School One	X	X	x	x
School Two	75/25	X	x	NO
School Three	50/50	transition toward	x	x

[157] School Three president, interview by author, Feb. 14, 2015.

[158] http://jdc._____.edu/cgi/viewcontent.cgi?article=1006&context=tjuadmin.

[159] School Three president, interview by author, Feb. 14, 2015.

Comparisons on the Integration of Technology

Technology enhances the delivery of student-centered learning by allowing students to interact with curriculum materials in different ways than previously available. All three schools have varying degrees of technology for teaching medical students. They all use a content curriculum management system that is either proprietary or purchased similar to the product named Blackboard to maintain course syllabi, student work, as well as providing faculty way to make material available to students. As this technology has been available for the last ten to fifteen years at universities, it is not discussed further. The strongest technological similarities are in all three schools' simulation labs. The schools are at different levels of incorporating PBL and IPE modules into their clinical skills simulation centers (sim labs).

Clinical skills simulation centers (sim labs) are an extension of technology in providing instructional content and assessment. There are partial skill/task trainers that are models of specific regions of the body that allow students to practice and perfect specific skills. Many sim labs are going digital with high-end computer simulators that can be programmed to mimic clinical encounters in operating rooms. The digital mannequins emulate many aspects of the human body, from the feel of the skin, to eyes opening, heart pumping, blood flowing, etc.[160] Many schools allow students to go into the sim labs on their own time and continue to practice and hone their skills on various procedures.

[160] "How Dummies, Drills Aid Medical Training," CBS News, Apr. 7, 2013, accessed Apr. 8, 2013, http://www.cbsnews.com/news/how-dummies-drills-aid-medical-training/.

Content Similarities

School One

School One's sim labs combine all methods of simulation, from standardized patients which are actors or community volunteers who agree to act as patients allowing medical students to practice their communication skills. Examples of partial skill trainers include an arm model to practice venous access for IV therapy and phlebotomy; or a head/lung model "used for the practice of manual ventilation, LMA, ETT, nasal intubation and bronchoscopy with performance feedback through the QuickLung computer program displayed on a PDA monitor."[161] The school has several high frequency mannequins that allow for simulation of surgery, multiple chronic illness symptoms, etc. The center aligns with its mission with School One's university system. The "mission of teaching, learning, and assessment through simulation recreating routine and complex situations, thereby improving patient care and safety. The center serves all five health professional schools."[162] The sim labs allow students to practice and perfect skills on their own before practicing on a human being. The center, one of the early leaders in sim lab experiences, also provides on-going professional development opportunities for internal and external clients: "We offer expertise and consultation in the use of standardized patients, high-fidelity simulators, and curriculum design including scenario development for simulation activities."[163] The ability to integrate medical humanities and professionalism skills expands due to these types of technologies.

[161] https://moodle.____edu/mod/book/view.php?id=157905&chapterid=16981.

[162] http://meded.____.edu/simulation.

[163] http://meded.____.edu/simulation.

School Two

School Two's sim lab is located in the library on its own floor. The lab contains both high frequency mannequins in operating suites as well as partial task/skill partial mannequins for specific skill building. The mission of the lab is "to improve patient outcomes with effective programs that promote and enhance practitioner skills, clinical competence, teamwork, and interdisciplinary collaboration,"[164] thus incorporating several recommendations as called for in the 2010 Carnegie Report for teaching teamwork and student-centered learning. The lab is open for students to use when classes are not in session to continue to perfect their skills.

School Three

School Three's Clinical Skills and Simulation Center allows students to practice and take the PBL cases to a different level as the clinical center uses "130 standard and simulated patients."[165] The simulation lab allows students and faculty to continually hone their skills as the center was intentionally designed to "support skills attainment sessions and structured practice sessions for every core skills set from invasive clinical skills to communication skills to team building skills."[166] The center is a stand-alone building that is available for all healthcare specialties to use, therefore allowing for interdisciplinary and IPE to occur.

[164] http://www._____.org/web/simulation.

[165] http://www._____.edu/university/clinical_skills_simulation.html.

[166] http://www._____.edu/university/clinical_skills_simulation.html.

Table 4.3 Similarities in the Integration of Technology

	Classroom management system	Simulation Labs	Sim labs and PBL	Sim Labs IPE
School One	x	x	x	beginning*
School Two	x	x	x	beginning*
School Three	x	x	in transition	beginning*

*Beginning means the sim labs and IPE modules are set up differently or located on different campuses, so to bring other students from different areas together requires negotiation with Deans of different schools and re-aligning course times.

Methods Similarities

School One

School One's sim lab allows instructors to prepare for both standardized patients and simulation experiences to occur together based on course content including PBL simulations. The sim lab is open for students to use to practice outside of class time.

School Two

The sim lab at School Two is only available for simulation experiences as standardized patients are used in different parts of the school. Some PBL is taught here. The lab is open for students to practice outside of class time.

School Three

The sim lab has space to encompass standardized patient interactions and simulated experiences, in addition to serving as the gathering place for PBL and IPE to occur. The lab has open hours for students to practice.

Table 4.4 Methods Similarities on the Integration of Technology

	Simulation Labs for PBLE	Simulation Labe for IPE	Simulation lab open for students to practice
School One	x	pending	x
School Two	x	pending	x
School Three	x	x	x

Organizational Methods of Curriculum Change

All three schools have undergone curriculum change in the last ten to fifteen years that began to shift expectations of faculty and provided a time to envision what medical education might look like at the turn of the twenty-first century. The publication of the 2010 Carnegie Report and grant support from the Josiah Macy Jr. Foundation provided opportunities for the three schools to expand their curriculum focus and given how technology has changed since the early part of the millennium the three schools are again undergoing curriculum changes. The three schools have also undergone leadership change in the last three years, contributing to changing expectations of what is taught, why it is taught, and how it is taught and who is teaching the material.

The three leaders interviewed for this project understand the time spent in the classroom is valuable learning time. The opportunity to reframe what occurs in the classroom requires several levels of buy-in from faculty and administrators at all levels as not only is the content changing, the way the content is delivered has implications on the building space and wiring. The staffing needs are changing, as one person used to deliver a lecture to 150 people. Now with the expectation of small group work in classes attention needs to be given to how students' needs are attended to. Also, the changes require that administrators and faculty revisit how the curriculum is monitored and assessed.

The president set the expectation for the deans from all of the healthcare professional schools will work together to truly model IPE. To make this expectation a reality, the deans must coordinate school schedules in a new way. This includes working around the logistical aspects of how to bring all students together in a physical location at the same time and to make sure all of the students participating have some grounding in the topic to be worked on. This includes preparing students from all disciplines that they will be learning to work together. The planning curriculum and delivery of curriculum takes time and effort away from each person's regular responsibilities.

All three schools recognize that change needs to happen; leaders of the three schools were given goals to reach. All of the schools are in different transitional periods and are working through different organizational methods. The three leaders understand that collaboration and partnership development are key aspects toward achieving success in a changing environment. All three schools are devoted to providing some level of

faculty development to allow faculty and staff to bring about the change required. All three are following an organization change model, as explained in each school's section.

Two of the three schools have an active scholar academy where faculty are supported to spend time pursuing pedagogical research to benefit their own teaching as well as the field. The third school is seeking financial support to create a similar program. The leaders understand and value the importance of nurturing faculty learning while at the same time working to create change on other fronts. These three areas have been affected how curriculum change occurs within the system of medical education that includes financial, legal, and other administrative aspects of running a medical school.

Each school in this section discusses the overarching goal that was to be met and how the school set out to change its curriculum; the methods section discusses faculty development.

Content Similarities

School One

Goal for new direction

In 1999 the dean of the medical school created the vision: "I want the educational programs of the School of Medicine to match the world-class quality of the research and clinical programs [of the school]."[167]

[167] School One administrator, interview by author, Dec. 15, 2014.

How the school set out to change its curriculum

A new vice dean of education with a solid record in medical education was hired with the responsibility to bring about the change. The vice dean referred to the book *Reframing Organizations*[168] as the orientation point the school used to change how curriculum was created and delivered at the medical school. The book looks at change through four lenses. The vice dean explains how he used each of the lenses to build collaboration for people begin to work toward the dean's vision. The execution of the vision was to create a curriculum that was "integrated, case-based, and web-supported."[169] The expectation for courses to "weave together strands of basic, clinical, and social sciences in an integrated manner. Clinical cases will be used throughout to motivate learning, increase information retention, and facilitate transfer of learning."[170] The execution of creating the plan and putting the plan into action took four years to fully implement.

"Curriculum change is all about organizational change, personal diplomacy, negotiation, conflict and collaboration where you can," says the vice dean of School One. To change the curriculum, leaders need to recognize how changing an existing structure or replacing the structure with something brand new will affect employees. Change leaders need to provide guidance on how to go about creating a place or format for the change to occur; they also need to provide people with instructions or guidelines of how to begin the process and as well as how to continue to provide support toward

[168] Lee G. Bolman and Terrence E. Deal, *Reframing Organizations: Artistry, Choice, and Leadership* (San Francisco: Jossey-Bass, 2008).

[169] Curry, 29.

[170] Curry, 29.

accomplishing objectives. This requires creating new committees and work groups. Once the groups have been established the next step is to create accountability mechanisms within each committee to set goals, as well as a mission and identifying objectives and values. The leader needs to offer support in a myriad of ways.

School One, working to implement its new curriculum, provided support to each working group through a mandate, providing a mission to accomplish in order to bring the whole together. One thing the vice dean pointed out is that teams involve working with people "some deliver and some do not, and accountability becomes really important. So that is kind of the structural view of how you organize things."[171] It is the one component that most people think about when looking at organization and change.

The next step in leading change is human resources (HR). The vice dean understood the importance of working to align individuals' goals, expectations, fears, anxiety, and needs with the organizational goals. This takes work as faculty and staff need to be equipped and rewarded, and they must understand how their goals fit within organizational goals, to enable them to succeed at the tasks required. As the vice dean said, "it's all about nurturing and supporting the people who have to make this work. So for us, it meant we had to invest a lot of time in leadership development."[172] The level of investment meant providing training to help people learn how to lead committees, to give them the skills to negotiate effectively when conflicts arose; to try to support the development of careers of people who wanted to do educational leadership and teaching.

[171] School One administrator, interview by author, Dec. 15, 2014.

[172] School One administrator, interview by author, Dec. 15, 2014.

It also led to creating a network for faculty who wanted to continue growing as teachers and scholars.[173]

To provide faculty assistance in implementing the new curriculum in 2000, School One set the goal that fifty percent of teaching had to occur in small group discussion formats. "Our faculty didn't know how to do that so we had to create a bunch of faculty development workshops to train faculty how to do it and to make sure they did it as opposed to a whole lot of mini lectures in small groups, which is what they wanted to do."[174] Thus using the HR lens to align individual goals within organizational goals became an important aspect toward that vision by providing developmental support.

The third lens according to Bolman and Deal is the political one. The political lens focuses on the competing demands within any system. They may range from financial, to time, to personal interest, to name a few.[175] To view curriculum change through this lens one needs to understand how to work collaboratively with individuals and in groups. "It's all about creating coalitions of people who are willing to follow you and to try and block coalitions that are trying to stop you. And win over as many groups, departments and players as you can in order to achieve the goal."[176] The dean explained the difficulty in helping faculty "give up their vested interest and slides sets they always used to create a new course that required them to acquire and learn new skills and responsibilities." He pointed out: "some people saw it as losing face, losing status,

[173] School One administrator, interview by author, Dec. 15, 2014.

[174] School One administrator, interview by author, Dec. 15, 2014.

[175] Bolman and Deal.

[176] School One administrator, interview by author, Dec. 15, 2014.

because their hours in the curriculum were cut and they didn't want to play." The reality turned out that some people left, as they did not want to change; others were persuaded and excelled. The dean noted, "often times, you can turn people around and most of the time it is done on one-to-one diplomacy." He went on to say, "it is a process of negotiation and diplomacy skills that turned some of the biggest reactors/naysayers into supporters, so that is the political realm."

The fourth lens is symbolic. The dean pointed out despite the job title there is little power but many ways to influence decisions, conversations, actions, etc. This was demonstrated by bringing everyone together in symposiums or curriculum retreats to try and envision the future. "Or in committee settings where we celebrate wins, it's all about speaking to the vision, values you want to achieve. Empowering people, recognizing people, rewarding people, and finding ways of holding up what we want to achieve, our vision so that others see it, celebrate it and accept it."[177]

In speaking about the process of changing curriculum in terms of organizational change the dean noted "I found all four were necessary as part of the change process. I see the same things playing out as we are going through our current curriculum change process. So change is very complex."[178] He pointed out the process was "emotionally exhausting. Some people come out feeling great about it, and others leave." The ability to achieve the end goal requires everyone to participate. The ability to participate is also tied in to recognizing the human capacity to change or move on.

[177] School One administrator, interview by author, Dec. 15, 2014.

[178] School One administrator, interview by author, Dec. 15, 2014.

School Two

Goal for new direction

The vice dean of education at the medical school came to the school with the vision for medical education: "To guide the development and life-long learning of a humanistic physician who is adaptive, critical thinker, collaborative, and scholarly."[179] The vice dean says one "needs to know what you want students to know and develop into as physicians, essentially begin at the end, and then begin to ask what kind of curriculum you need to help the person get there."[180]

How the school set out to change its curriculum

The vice dean of education arrived in February of 2013 and the curriculum was to launch in July of 2013. There had been a leadership change during the curriculum development with the previous vice dean leaving and a person serving as interim. When she arrived, there were four months to curriculum launch, so she had to make decisions without much time for group process.

> A lot of thinking on curriculum design had been done but there was a pause in the action. So to some extent there needed to be decisions made from the top down to move it forward. The decision process had been collaborative for three years. At some point it needs to go from idea to implementation, even at 70% to launch it. Not the ideal, but needed to be done.[181]

[179] School Two administrator, interview by author, Mar. 2, 2015.

[180] School Two administrator, interview by author, Mar. 2, 2015.

[181] School Two administrator, interview by author, Mar. 2, 2015.

She relied on the material and curriculum recommendations, but the overall design was not hers to implement; she had to adapt to the curriculum. There were some aspects she did change in order to create a longitudinal plan that reflected the vision of developing life-long learners.

The vice dean successfully used Kotter's eight steps to organizational change in a previous position.[182] In this position the change process had begun and was ready to go straight to steps seven and eight—sustaining acceleration and instituting change.[183] Thus many decisions were based on the vision of beginning with the end in mind meant reviewing the curriculum to ensure it would:

- Guide—guide or coach students, through the cycle of process, formation, and development
- Setting up life-long habits of on-going learning to remain interested and curious
- Humanistic physician, core at our school, today as we look at healthcare, around patient-centered approach, meaning patient as partner in healthcare delivery and management.
- Adaptive, given educational changes in medicine, the ability to use critical thinking skills, framing good questions, finding good literature, critically appraise and use that information, work in collaborative teams, and scholarly have space to practice evidence based, based on current information.[184]

The vice dean referred to the Heifetz model on longevity, recognizing it takes five to ten years to fully engage change.[185] Requiring faculty to think in a student-centered

[182] 1. Create sense of urgency; 2. Build a guiding coalition; 3. Form a strategic vision and initiatives; 4. Enlist a volunteer army; 5. Enable action by removing barriers; 6. Generate short-term wins; 7. Sustain acceleration; 8. Institute Change. "The 8-Step Process For Leading Change," Kotter International, 2015, accessed Apr. 27, 2015, http://www.kotterinternational.com/the-8-step-process-for-leading-change/.

[183] "The 8-Step Process For Leading Change."

[184] School Two administrator, interview by author, Mar. 2, 2015.

[185] Ronald Heifetz developed the groundbreaking model of leadership called Adaptive Leadership. His research focuses on the challenge of building the adaptive capacity of organizations and societies.

manner meant recognizing the faculty would go through transformation changes. The transformative process requires the faculty to adapt and bring the change process to fruition. The vice dean referred to the model developed by Kurt Lewin, of working with people to recognize they need to change (unfreeze). Once people are ready to change, they need to understand the context of what is required and why (process). The final stage is when people are comfortable with the changes and ready to implement (freeze).[186] The curriculum has been implemented for two years. The vice dean looks "forward to the opportunity to learn from the first iteration and make adjustments to the curriculum [this summer]."[187]

Reviewing the curriculum connects with aligning the curriculum to the LCME standards to be implemented in the 2015-2016 curriculum. The vice dean, familiar with

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"Ronald Heifetz," Harvard Kennedy School, 2015, accessed Apr. 27, 2015, http://www.hks.harvard.edu/about/faculty-staff-directory/ronald-heifetz.

[186] The first stage (unfreezing) involves overcoming inertia and dismantling the existing mind set. It involves getting over the initial defense mechanisms that people exhibit to avoid making a change. People eventually realize that change is necessary and urgent, and this realization allows them to move on to the next stage.

In the second stage, the actual change occurs. This is typically a period of confusion and transition in which people are unsure about the change and what may happen in the future. People are aware that the old ways are being challenged, but they do not yet have a clear picture as to what these ways will be replaced with. During this stage, an organization's leaders need to focus on clearly communicating to employees the reasons for change and the steps needed to achieve it.

Lewin labeled the third and final stage freezing, though it may be useful to think of this stage as "refreezing." During this stage, the new mindset of the change begins to become the standard, and people's comfort levels return to normal. Many people criticize this component of Lewin's model, arguing that there is never time for people to comfortably adapt to change in the fast-paced world of today.

Although some managers still use Lewin's model, its most important contribution is the idea that change should be thought of as a process instead of individual stages. This is important for understanding how employees may react to change in the workplace and why some may adapt more quickly to change than others.

Source: Boundless, "Phases of Organizational Change: Lewin." Boundless Management, Dec. 8, 2014, accessed Mar. 4, 2015, https://www.boundless.com/management/textbooks/boundless-management-textbook/organizational-culture-and-innovation-4/managing-change-for-employees-40/phases-of-organizational-change-lewin-214-1039/.

[187] School Two administrator, interview by author, Mar. 2, 2015.

the LCME standards, sees School Two's curriculum playing out in four pillars. She described the four pillars as biomedical, clinical, humanities, and health-systems.[188]

The school's curriculum committee works on a regular basis and every year reviews the curriculum of each course, "essentially allowing the courses to be reviewed and evaluated every two years."[189] The committee works with the vice dean of academic affairs in updating the curriculum or course content based on student and faculty feedback. "We are the perfect innovation laboratory," she said. "We can make changes at the medical school level and follow it through all the way through subsequent training and full practice to physicians."[190]

School Three

Goal for new direction

On the first day on the job, the new president of the medical school set the direction of what he planned to do and what he wanted from staff, faculty, and students. "Our job is to honor [the medical college's] past, to understand and invest in the present and to create a bright, robust future for those who follow us in providing care, in teaching health professionals and in developing new cures and treatments here at this remarkable institution."[191] He then stated the five ways transformation would occur:

- **We will work toward becoming a united entity.** Success in the future will be based on working together to share our understanding of health

[188] School Two administrator, interview by author, Mar. 2, 2015.

[189] School Two faculty member, interview by author, Feb. 9, 2015.

[190] http://www._____.org/documents/10100/15045/Annual+Report+2014/62b236f6-6f7b-40bf-84bc-624fdf672892.

[191] http://leadership._____.edu/2013/09/06/beginning-day-one/.

for patients, families and communities.

- **We will have fun.** Teaching students, caring for patients, doing research is serious business, but all are enhanced by creativity, passion and flexibility.
- **We will be both entrepreneurial AND academic.** The entities that will have an optimistic future in academic healthcare will be those that are proactive, inclusive and entrepreneurial in how they deliver on their promises to the community, future health professionals and patients.
- **We will start thinking and acting like a high-powered team.** While I can't predict the future, I know that the winners will be those that can get through the silos of the past.
- **Most importantly, we will remember why we go to work every day.** There are people around the city, state, country and the world that rely on the physicians, nurses and other healthcare professionals at [this school] to create or maintain health for them and their loved ones.

At [this school], we have the power to create an optimistic future for ourselves, our patients, our students and the community. I am happy and honored to be a part of that creative, strategic and transformed future and to create a new "possible."[192]

How the school set out to change its curriculum

The president came in with a set of goals to transform both the medical school and its healthcare system. In a previous position, as dean of a medical school where the medical school did not own the hospital, changing the curriculum and practicing the change were not easy to implement; he worked around the obstacles to achieve the final goal, but understands first hand the importance of having a university and healthcare system connected in order to bring about real change to healthcare education and systematically. Currently he works in partnership with the medical school dean to begin to change the curriculum and strengthen other components.

To begin to turn things around, he began by holding a series of town meetings. The meetings turned into visioning sessions, and ultimately resulted in creating an

[192] http://leadership._____.edu/2013/09/06/beginning-day-one/.

organizational change model stemming from faculty and staff input.

When asked about how he works to bring about change, be it curricular or organizational, he says he uses the Steve Jobs model. When asked to explain, he said it is essentially trying to think about what is going to be out there in ten years. He wants people to think about the ideal and then start putting those ideals into reality. When speaking with groups of people the president points out we do not want to compare ourselves to look-alikes, we want to be ahead of the pack.[193] He encourages people to think of what they want to be and then finds resources to support the development of faculty and staff.

He went back to school while practicing medicine to earn a MBA; that is when he saw there were different ways to teach people, and this inspired him to change the structure of medical education.[194] Thus, he actually employs several organizational change tenets that are similar to those of the other deans, of understanding there is a process to bring about change.

He fully supports innovation and recently shared an article with his faculty and staff called "Accelerating change: Fostering innovation in healthcare delivery at academic medical centers."[195] He devotes his energy encouraging people to think outside of the box. He cited the following statistic for how he works to lead people. "There are some people, 20 percent that will change; 15% that will not change, and 65% who will

[193] School Three president, interview by author, Feb. 14, 2015.

[194] School Three president, interview by author, Feb. 14, 2015.

[195] Andrey Ostrovsky and Michael Barnett, "Accelerating Change: Fostering Innovation in Healthcare Delivery at Academic Medical Centers," *Healthcare* 2, no. 1 (Mar. 2014): 9-13, accessed Apr. 27, 2015, http://scholar.harvard.edu/files/mbarnett/files/ostrovsky_hjdsi_2014.pdf.

change over time."[196] He pointed out most leaders spend time with the percent who change because they are easier to work with. He points out leaders usually never spend time with the largest group, the 65% who are willing to change over time, because it takes time and effort. He recognizes the real work has to happen with this group and therefore has worked to bring in developmental aspects to gain the support of that group. In an interview he discussed how as a physician, he learned to work in autonomy, to be competitive, and to follow a hierarchical model. He wants to change that model by having medical students take courses in other colleges with the university to help them understand the multiple points of view in healthcare delivery as well as various curriculum models.

The president worked closely with the dean of the medical college to restructure the curriculum committee and to realign its vision with the organizational vision. The president says he is pleased with the number of faculty and staff that have embraced the notion of changing how they work. He points out committees are necessary but need to innovate, not stagnate. Thus, it is important to choose members who want to change. The president describes the current curriculum as "a hybrid, with way too many lectures, first two years is with patient mentors, simulations, and interprofessional education."[197] He challenged the faculty to throw out the curriculum and think outside of the box.

[196] School Three president, interview by author, Feb. 14, 2015.

[197] School Three president, interview by author, Feb. 14, 2015.

Table 4.5 Content Similarities Organizational Change

	Goal for new direction	School used Org Change Process
School One	x	X
School Two	x	X
School Three	x	X

Methods Similarities

School One

The faculty received training for how to change their teaching style. This was not a simple one-day training, as changing the classroom format equates with creating a paradigm shift where everything one knew is no longer as relevant.[198]

The role of faculty in this structure requires providing support and connections to higher-level skill analysis by asking probing questions if necessary versus the lecturing format faculty traditionally use. Some schools say the role becomes more like that of a facilitator or a tutor. "The tutor's challenge is to forego the gratification of dispensing facts, and walk the tightrope of effectiveness by balancing intervention in the group process between an informal, empathetic style and subtle and sparing use of personal

[198] Thomas S. Kuhn, *The Structure of Scientific Revolutions*, 2nd ed., enlarged (Chicago: The University of Chicago Press, 1970), 10. Kuhn wrote about how scientific advancements happen over a period of time and are continuous. He called the change scientific revolutions, and pointed out the time period is how long it takes for people to understand accept the shift, he called this action a "paradigm shift."

content expertise."[199] Dr. Amin Azzam, a medical educator, points out that one teacher no longer holds all of the answers on a given subject. The internet has opened up so much accessible information. "Despite this availability of learning resources, actual learning will only be optimized if put into the framework of a meeting between teacher, learner, assessment and context."[200] Understanding the role between student and faculty for how to interpret medical information remains a critical component of education begins to open up possibilities for incorporating the humanities into the curriculum for teaching medicine.

The staff development led to the formation of one of the first scholars programs in the country. The vision of the academy is "to promote an educational climate that accelerates advances in teaching and learning, champions educator careers and improves health."[201] The members have to apply and be accepted. The expectation is that members will work on scholarly projects toward improving their teaching, knowledge, and skills. The idea received funding so scholars are supported in their research efforts. It spawned a whole network of scholar-type programs and led the formation of the "Academies Collaborative" that now has several medical school members. The group meets annually as part of the AAMC annual meeting. A member of the academy stated "it has become my professional community; to be able to work with other medical educators has been instrumental to my work."[202] The number of medical schools investing in their faculty by

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[199] G. Maudsley, "Roles and Responsibilities of the Problem Based Learning Tutor in the Undergraduate Medical Curriculum," *BMJ : British Medical Journal* 318, no. 7184 (1999): 657-61.

[200] Azzam.

[201] http://medschool2._____.edu/academy/aboutus/mission.aspx.

[202] Scholar, interview by author, Dec. 12, 2014.

setting up equivalent academies of scholarship demonstrates the power of investing in scholarship.

School Two

Part of the changes include faculty development that occurs during retreats and in one-hour session. The department chairs and curriculum committee chairs bring in an academic affairs team to help professors learn various ways for adapting to new learning styles.

The vice dean discussed the importance of continuing professional education and has started sending faculty to the Harvard Macy Institute for educators in health professions.[203] While recognizing not everyone is able to be away from home for extended periods, she feels it is important to step away from the campus to immerse oneself in a different learning environment to reflect and review new ideas. She really supports faculty having the opportunity to immerse themselves in an atmosphere where they have the opportunity to reflect on their teaching.

A long-standing program within the medical college is the Junior Faculty Development Program. Department chairs have to nominate junior faculty versus self-selection. It is a one-year program requiring attendance at a two-hour workshop every Friday morning. Workshop topics include research, clinical and pedagogical teaching

[203] The Harvard Macy Institute brings together health care professionals, educators, and leaders to discuss the critical challenges of the day and design innovative solutions that have a lasting impact on the way medicine is practiced and students are educated. Our goal is to foster transformative learning experiences that prepare the Harvard Macy scholars to lead institutional change as well as discover and harness new perspectives which may contribute to their professional growth. "Leaders, Educators, Innovators," Harvard Macy Institute, 2015, accessed Apr. 27, 2015, http://www.harvardmacy.org/About-Us/Overview.aspx.

skills, and academic and career development. The vice dean discussed how prestigious the nomination has become despite no monetary reward and commented on how many of the research projects undertaken have resulted in curriculum changes. Participants must complete an original project approved by the department chair and supported by a senior faculty mentor. The vice dean discusses how faculty members who serve as mentors to junior faculty are members of the school's Mentoring Academy. The faculty development program allows both junior and senior faculty to continue to learn and hone their teaching skills.

School Three

Faculty Development

The medical college has a strong faculty development core offering workshops and trainings in IPE, PBL, and integrating technology. Faculty are required to attend workshops. As the curriculum is currently under construction, faculty development has an important role.

The president began working in 2014 to develop a five million dollar Leadership Academy that will customize experiential learning for faculty to transform and overcome biases. He states "the way we select and educate physicians—is based on a cult, not a creativity bias; we need to deprogram them from the cult and teach them how to be creative and support that creativity."[204] Part of this leadership academy will help to change how physicians think of themselves and to begin to set expectations for thinking differently.

[204] School Three president, interview by author, Feb. 14, 2015.

Table 4.6 Methods Similarities of Curriculum Change

	Faculty Devo	Academy of Scholars
School One	X	x
School Two	X	variation
School Three	X	pending

Comparisons on Dimensions of Contrast

This section explores the differences between the three schools in regard to the role of the three areas studied: medical humanities in curriculum reform; use of technology in the curriculum; and how curriculum change was integrated through an organizational change process. Each of the three areas is described under the headings of content (what is taught or implemented) and methods (how it is taught or implemented).

Integration of Medical Humanities in Curriculum Reform

The three schools, while committed to using the humanities as part of the change in curriculum to teach medicine, each integrate medical humanities differently as the new leaders set new expectations. One leader removed it from the curriculum to be rolled out in the year 2016. One leader worked with the chair of the medical humanities department to expand the perception of humanities. Another leader wants the humanities to be at the core of the curriculum to prepare physicians to be adaptable to the change always on the horizon.

The first part of this section focuses on the content, specifically how the schools differ in medical humanities course content.

Content Contrasts

School One

School One built medical humanities into its courses during the curriculum change that occurred in the year 2000. The new curriculum to begin in the 2016 academic year does not have medical humanities as one of its key focal points. The school has a department of medical humanities. Some of the core faculty serve as members of the medical humanities department. However, the ability to innovate and meet the standards set out by the LCME allow faculty to incorporate aspects of the medical humanities into the classroom structure as students in PBL and IPE are asking for content that the humanities can provide for teaching medicine, be it on-line programs, archives, etc. School One has the history of technology innovation to continue to integrate the humanities into the curriculum, but it is no longer one of the core emphases of the 2016 curriculum.

School Two

School Two was founded with an intentional focus on medical humanities. However, the new vice dean of education is working to expand the concept of medical humanities. The current chair of the humanities department worked with the vice dean to reframe the humanities as medical humanities and health curriculum. A new course in

communications developed as a result of the discussions about communication. The course helps students to translate humanities concepts into healthcare settings.

The vice dean explained how courses emerged from reframing the humanities. Another new course on "mind/body" examines factors that affect people's behavior. Examples of material discussed include: why patients do not follow doctors' instructions, how the placebo effect works, and how to look beyond biomedical diagnosis to consider socio/cultural factors. The reframing of medical humanities as part of an integrated theme, from a humanities focus to humanities and health, broadened opportunities to collaborate with other divisions and healthcare schools within the university. The chair of the medical humanities while working with students saw a need for a translational/bridging component to help them enter each patient episode with cultural humility in order to find out what is unique about each patient, thereby improving physician/patient relationship and patient outcomes.[205] These two classes are designed to help improve patient-centered care. This expansion of how the humanities can be used allows entry for greater IPE opportunities and expands the possibilities for integration into PBL scenarios.

School Three

School Three has the opportunity to rethink and recreate their curriculum to make the president's vision a reality. As the president sees how the humanities broaden one's ability to understand time and space in different ways, the school stands at an exciting precipice. The humanities are not an extreme stretch, as many extra-curricular

[205] School Three administrator, interview by author, Mar. 2, 2015.

possibilities exist. This school also has a history of IPE so the ability to incorporate the humanities into this format increases the opportunity for maximizing the student-centered learning and healthcare teams. The school, because of its location, encourages learning to occur off campus in cultural institutions; this has the potential for truly expanding learning how the humanities can inform the study of medicine.

The school posted a job description for an associate dean for academic affairs/undergraduate medical education in the spring of 2015. The criteria for the position include "evidence of innovative approaches to medical education; demonstration of leadership competencies . . . . ability to work collaboratively and collegially with multiple individuals from a wide variety of backgrounds using a creative, team-orientated positive and flexible approach."[206] This one example demonstrates how the president's vision of transforming the medical college is underway.

Table 4.7 Content Contrasts in Medical Humanities Integration

Column1	In core mission of curriculum	Course content delivery outside of classroom	Expanding humanities across courses
School One	implied	x	exploring
School Two	X	pending	x
School Three	shifting toward	transition toward	pending

[206] "AAMC Career Connect," Association of American Medical Colleges, Apr. 27, 2015, careerconnect.aamc.org/jobs/.

Methods Contrasts

The delivery of medical humanities varies in each of the three schools, as the level of integration and the focal areas of the instructors are different. School One uses current technology for journaling and discussions. School Two offers a medical humanities elective course as well as integrating the humanities into courses. School Three is working on intentionally integrating humanities into more courses but currently offers several extra-curricular programs.

School One

School One has invested both human and financial resources in understanding how technology affects the delivery of medicine. A few of the many examples for delivering curriculum to consider are iPads and iPhone applications designed for content delivery. One app allows "Program Directors to hold online journal clubs and quality improvement discussions, helps residents prepare for board exams with weekly quizzes, and provides access to landmark research articles."[207] This is an example of how using current technology allows faculty and students to interact with the curriculum or expand certain aspects to better understand social and cultural awareness.

The ability to integrate medical humanities and professionalism skills expands due to these types of technologies.

[207] One example is an app called Docphin an application that can be used by physicians, clinical spaces or in residency programs to quickly read articles or see lectures, it then categorizes information so that it can quickly be recalled. The webpage promotes it this way: "Docphin for Residency Programs is a web and mobile platform." "Next Generation Residency Training to Help Meet ACGME Milestones," Docphin, 2015, accessed Feb. 10, 2015, https://www.docphin.com/residency-programs accessed.

School Two

Students have a choice of three electives in their fourth year. In a fourth year elective the professor uses jazz as an example of teaching students about the physician/patient relationship. Specifically the "principles of improvisation that relate to an individual communication act (building space into one's communication), a physician's communicative style (developing one's voice), and the communicative process of the medical encounter (achieving ensemble)."[208] The author explains, "At all 3 levels, the traditions of jazz improvisation can inform efforts to research and teach medical interviewing by fostering a contextualized view of patient-physician communication."[209] Integrating music into the core curriculum allows music to teach medicine in ways that engage students in a different manner.

School Three

The president of the school believes physicians need to learn how to observe and listen. School Three teaches students these techniques by taking medical students to art museums. "They have students look at the art and begin to interpret what is going on within the piece of art."[210] Museum educators have assessed how art education affects development of critical thinking skills. One museum created a checklist for evaluating students' critical thinking skills through questions asked or written reflections that could be modified for medical education. The Isabella Stewart Gardner Museum & Institute for

[208] Paul Haidet, "Jazz and the 'Art' of Medicine: Improvisation in the Medical Encounter," *Annals of Family Medicine* 5, no. 2 (2007): 164-69.

[209] Haidet.

[210] School Three president, interview by author, Feb. 14, 2015.

Learning Innovation Critical-thinking Skills Checklist provides a way to assess students.[211] The checklists looks at seven components to evaluate critical thinking in a museum.[212] These same skills are transferable to the practice of medicine, and the president has suggested "physicians must be comfortable practicing [skills of observing and listening] as they are increasingly recognized as vital skills for physicians to master."[213]

The school began an elective class in drawing for first-year students. It is based on a class taught at Harvard's dental and medical school called "Training the eye: improving the art of physical diagnosis."[214] One of the professors at School Three points out: "For lack of a better term, we've left out humanities," he says. "We've ignored art, poetry, and drama, all of which offer a different way of thinking, seeing, feeling, and

[211] Jessica J. Luke, Jill Stein, Susan Foutz and Marianna Adams, "Research to Practice: Testing a Tool For Assessing Critical Thinking in Art Museum Programs," *The Journal of Museum Education* 32, no. 2 (Summer 2007): 126, accessed Apr. 27, 2015, http://www.jstor.org/stable/40479583.

[212] The seven skills are:

1. observation skills: what something is or not, naming or identifying what is happening, how it looks, where it is located;
2. Interpreting: what are the characteristics or feelings identified, what are the intentions;
3. Evaluating: based on personal preference, perceived merits (could include professional education)
4. Associating: recognizing the object/situation directly with prior experiences or knowledge, making clear connections to personal experience;
5. Problem finding: notes or requesting information or identification, identifies information needed to form a conclusion/opinion; may propose a hypothesis in conjunction with stating the problem;
6. Comparing: what is similar or different, noticing relationships between situations/objects; notices patterns
7. Flexible: Thinking about multiple possibilities.

[213] School Three president, interview by author, Feb. 14, 2015.

[214] S. Naghshineh et al., "Formal Art Observation Training Improves Medical Students' Visual Diagnostic Skills," *Journal of General Internal Medicine* 23, no. 7 (2008): 991-97, doi:10.1007/s11606-008-0667-0.

engaging with the world."[215] He went on to say that medical school

> encourages the development of left-brain activities, favoring the verbal over the visual, the scientific over the artistic, and ignores growing evidence that people who think in pictures may have greater powers of intuition and creativity. One answer, said [the professor], is to reintroduce spatial and visual thinking into the med school curriculum, and to encourage the admission of students with more flexibility and empathy.[216]

These types of courses demonstrate how the humanities contribute to one's learning of medicine.

Table 4.8 Methods Differences in Medical Humanities Integration

	Technology of Med Hum learning	course content elective after 2 intro courses
School One	up to indiv faculty as well as avail in Med Hum courses	X
School Two	up to indiv. faculty	mandatory in year 4
School Three	exploring	X

Technology Integration Contrasts

This section looks at the differences in how the three schools use technology to change how the curriculum is planned and delivered. The difference is striking as School

[215] Ilene Raymond Rush, "Restoring Right-Brain Activities to Medical School," Philly.com. Jun. 15, 2014, accessed Apr. 27, 2015, http://articles.philly.com/2014-06-15/news/50600582_1_burnout-medical-students-salvatore-mangione.

[216] Rush.

One, located on the west, coast incorporates technology into the classroom using the latest technology. This may be a result of being located on the west coast where technology and innovation are ever present.

Content Contrasts

School One

Technology enhances the delivery of student-centered learning through the way students interact with curriculum materials. At the opposite end of the spectrum is Massive Open Online Courses (MOOCs). As the MOOCs are usually free, a variety of medical courses are available and provide students ways to gain information in a different format or to explore another area.[217] MOOCs provide a way students may quickly review various subject material. As the vice dean commented, "There are lots of ways technology and entrepreneurs are finding ways to use it to advance teaching and learning."[218] Faculty are using iPads and iPhones as a way to incorporate immediate feedback using a digital polling system, thus medical students no longer need to be stationed in a sedentary way to participate in classroom polls. "In the classroom itself, a lot of places are adopting engagement technology, used to have clickers, increasingly you can just use smart phones to set up a polling in the classroom, so you can figure out where the students are, and give them small groups work, have them report out,

[217] Coursera is an on-line organization that hosts many college level courses available for free. One example is a course called "Going out on a limb that focuses on the upper limb, anatomy, muscles, and some pathologies." A doctor who teaches anatomy to medical students at the University of Pennsylvania teaches the course. "Coursera," MOOC List, accessed Feb. 14, 2015, https://www.mooc-list.com/initiative/coursera.

[218] School One administrator, interview by author, Dec. 15, 2014.

paramount of the application."[219] Understanding what information students are receiving and how they are receiving it and then making it accessible helps align curriculum with student-centered learning.

Another example of technology for instructional purposes is a new project underway at School One that has students working in small groups editing information on Wikipedia.[220] This project is a joint project between Wiki Project Med Foundation, a foundation focused on improving the medical content of Wikipedia and the school. The goal is to have students review articles and edit them using standard language, versus medical language. The project will give the public better access to medical information, while teaching medical students how to translate their medical knowledge into standard language the layperson can understand.

School Two

School Two currently has pilot projects to study ways to use the electronic health record (EHR) with patients, while maintaining aspects of the traditional PPR. The vice dean and her faculty are trying to understand how to teach students to work with EHRs while seeing patients. They are struggling with how to integrate technological aspects of treatment with the humanistic interaction between physician and patient communication when admittedly the physician appears to be more concerned or focused on the technological tool than on the patient.

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[219] School One administrator, interview by author, Dec. 15, 2014.

[220] Juliana Bunim, "UCSF First U.S. Medical School to Offer Credit For Wikipedia Articles: Course Aims to Teach Students to Increase Reliability of Medical Information," University of California San Francisco, Sept. 26, 2013, accessed Jan. 31, 2015, http://www.ucsf.edu/news/2013/09/109201/ucsf-first-us-medical-school-offer-credit-wikipedia-articles.

School Three

The medical school dean "challenged the Curriculum Committee to consider current, best teaching practices in medical education and change the curriculum if necessary."[221] The education services librarian accepted the challenge and changed the medical informatics presentation from a lecture to the development of on-line medical case studies, thus showcasing how staff and faculty can facilitate medical student learning.

Table 4.9 Content Contrasts in Technology Integration

Column1	expectation of faculty and students	Courses designed for student's own technology to be used	physical space accomodates technololgy
School One	x	X	x
School Two	up to indiv fac	exploring	most
School Three	beginning	Available	most

Methods Contrasts

Each school integrates aspects of technology into the curriculum differently. All three schools support faculty who are innovative and willing to look at how using

[221] Dan Kipnis, Anthony Frisby, and Liz Mikita, "Multi-disciplinary Medical Case Study Development for First Year Medical Students" accessed May 2004, accessed Apr. 27, 2015, http://library._____.edu/Education/EdServices/pdfs/mla_poster.pdf.

information available outside of the literal classroom can expand the context of learning objectives.

School One

Apps designed as tutorial information as well as content driven are quickly emerging and will affect the way instruction occurs in the classroom. "Our students were having difficulty learning the neuro-exam, so the neurology faculty worked with students to develop an app that now anyone can buy and download for 3-4 dollars and learn how to do the exam."[222]

The Wikipedia course is taught by having students choose an article and work on analyzing the data contained to verify if the data is correct or incorrect. This teaches students critical skills of analyzing as well as forces them to translate their knowledge into standard English. The student works with the instructor and a mentor from Wiki Foundation to upload the corrected or updated version of the article.

In the PBL portion of courses, students are allowed to use technological devices in the room to begin to diagnosis and come up with potential diagnoses.

School Two

The vice dean admits when it comes to medical education, they have made the easy technical changes for medical education of putting many things on-line, including syllabi, reflection papers written and turned in on-line, large groups sessions capture, etc. She admits they are not as technically advanced in incorporating new aspects of

[222] School One administrator, interview by author, Dec. 15, 2014.

technology as other medical colleges. While apps have not been designed for course or tutorial review, faculty and their students have created YouTube videos to depict certain course material.

"What I think is going to happen will be the development of a national/international repository of evergreen knowledge, the information that does not change and required of physicians."[223] She reflected that lectures would be given by the best of the best faculty so students can download and watch in preparation of their course work. She points out that given technology it no longer makes pedagogical sense for 140 medical schools to be giving Krebs cycle lectures in lecture format when it can become part of repository that serves as preparatory material students.[224] Professors can reference the lectures in education settings in active/problem solving group setting. Technology allows that change to happen and School Two is aware of the change while in the transition phase.

The PBL sessions are not allowed to use technology in the first session, as the intent is for students to draw on the knowledge they have gained in their lifetime and to use the time the group is together to begin to discuss and learn from each other.

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[223] School Two administrator, interview by author, Mar. 2, 2015.

[224] K Krebs, Sir Hans Adolf (1900–1981), German-British biochemist. Krebs made major contributions to the understanding of metabolic processes. In 1932 he discovered with the German biochemist Kurt Henseleit a series of chemical reactions occurring in mammalian tissue by which ammonia is converted to urea. In 1937 he discovered an essential series of intermediate reactions in the oxidation of foodstuffs: the citric acid cycle. Now known as the Krebs cycle, these reactions have proved to be of vital importance in our understanding of metabolic processes in the cell. In 1953 he was awarded the Nobel Prize for Physiology or Medicine for his researches in metabolic processes. "Krebs Cycle," Merriam-Webster, 2015, accessed Apr. 27, 2015, http://www.merriam-webster.com/medical/krebs%20cycle.

School Three

School Three's Clinical Skills and Simulation Center allows students to practice and take the PBL cases to a different level as the clinical center uses "130 standard and simulated patients."[225] The sim lab allows students and faculty to continually hone their skills as the center was intentionally designed to "support skills attainment sessions and structured practice sessions for every core skills set from invasive clinical skills to communication skills to team building skills."[226] The center is a stand-alone building that is available for all healthcare specialties to use therefore allowing for interdisciplinary education and IPE to occur.

The school's president excites people about thinking about the future. He "has drawn a blueprint for the institution's future that heavily emphasizes technological innovation, strategic partnerships, increased philanthropic help and consumer-friendly health care."[227]

[225] http://www._____.edu/university/clinical_skills_simulation.html.

[226] http://www._____.edu/university/clinical_skills_simulation.html.

[227] John Marchese, "How Jefferson's Stephen Klasko Intends to Fix Our Screwed-Up Health-Care System," *Philadelphia Magazine*, Dec. 14, 2014, accessed Apr. 27, 2015, http://www.phillymag.com/articles/stephen-klasko-jefferson-future-health-care/#KDQgc6l2hBYG594u.99.

Table 4.10 Method Contrasts in Technology Integration

	Apps as instructional and tutorial	lectures on-line so not part of class time	PBL designed for on-line work
School One	x	X	x
School Two	tutorial	pending	partially
School Three	shifting toward	transition toward	beginning

Organizational Methods of Curriculum Change

The organizational aspects of curriculum reform, coupled with advancements in technology delivery of curriculum in different platforms, have created the freedom to invent new syllabuses and learning styles. However, with the freedom comes the questioning of one's professional identity that causes some faculty and staff to leave the organization. Also the intense work must be done around planning how current content or new content fits into existing LCME standards and requirements to maintain accreditation. These three components are aspects the leaders need to consider when leading their staff and faculty toward the overarching vision of producing students to practice medicine in the 21st century.

This section discusses the differences in how each organization supports their staff and faculty to adapt to the changing requirements

School One

The message on the website describing the medical curriculum reads, "medical curriculum provides a set of educational experiences designed to support students' mastery of the core knowledge, skills, and attitudes needed to achieve their goals as physicians, researchers, teachers, and public servants."[228] The medical school created this goal and provides the support to achieve how it is integrated. For example, courses described in the catalog also convey the expectations. Faculty are provided opportunities to continue to develop their curriculum and research around the expectations. The school has set the expectation for continual improvement. Even with a new curriculum to be introduced in 2016, the expectation of staff and faculty to continue to develop remains a core investment. Thus the implied expectation to excel is integrated at all levels of medical education.

School Two

The vice dean works with department chairs and faculty to ensure the curriculum meets the 2015 LCME guidelines. She understands that medical education is changing and works to encourage opportunities for staff and faculty to think about change. She understands that faculty need to be supported to carry out the school's vision of "guiding the development and life-long learning of a humanistic physician who is adaptive, collaborative, and scholarly."[229] She understands from personal teaching experience that the point of teaching is not about what the teacher does, it is about what the students gain

[228] "Competencies, School One's website, accessed Feb. 1, 2015.

[229] School Two administrator, interview by author, Mar. 2, 2015.

and take away from the experience. She works hard to provide training on teaching in small group settings. Thus she is currently supporting pilot programs on how students are recording information and reviewing information in EHRs as well as expanding IPE opportunities to incorporate students in health care professions and medical school to learn how to investigate and solve healthcare problems together.

School Three

The president has set the expectation that the curriculum and how it is taught and thought of needs to radically change. He has given people the framework to fill in, and has worked to create retreats where brainstorming can occur around changing how curriculum is delivered. He shared, "You may be surprised: Teams aren't taught in medicine."[230] The expansion of IPE among all of the health schools within the university and working with them is one way to teach and model healthcare teams as recommended in the 2010 Carnegie report.

School Three has a Center for Teaching and Learning that provides one-on-one consultation for faculty and staff to create or redesign their curriculum. They offer support for faculty to develop assessment for traditional, blended, and online courses. In keeping with the president's charge to innovate and think ten years ahead, the Center has created an electronic learning dashboard designed for the iPad so faculty may create or collect relevant material in a learning module that is then delivered to students via their iPads. The dashboard "allows instructors to create and use content objects to design

[230] http://leadership._____.edu/2014/10/27/alumni-essay-from-delivering-babies-to-delivering-revolutions/.

modules and topics to make up their courseware."[231] School Three's Center for Teaching and Learning provides a one-stop shop for faculty and staff to learn how to develop course content on different platforms by providing skilled staff who are instructional design specialists or educational technologists charged with helping to make learning student-centered. Thus the charge to change the curriculum is supported by having physical structures able to accommodate the change as well as dedicated staff to help faculty make the content changes to curriculum.

Table 4.11 Contrasts in Organizational Change

Column1	staff support for curricul change	Course content delivery outside of classroom	Org driven by Accreditation or New Discoveries
School One	yes	X	both
School Two	up to dept chairs	Pending	accreditation and research
School Three	dedicated center	transition toward	innovation priority then accreditation

[231] "Guide to Academic Technologies, Design, Build and Deliver your Courses" handbook, available at library._____.edu/Technology/DBD_Bookletpdf.

Chapter 5

CONCLUSION

The goal of this case study was to examine the mechanisms three innovative medical schools use to incorporate aspects of medical humanities and technology into their curriculum reform efforts and to examine if those models are transferable to other medical colleges. Three questions were studied: 1) How does a leader work to reform the curriculum in terms of leadership, pedagogy, and faculty development?; 2) How are the medical humanities integrated into the curriculum?; and 3) What is the role of technology in transforming curriculum? Observations, recommendations, and areas for further research are discussed in this chapter.

Summary of the Observed Impact and Integration of Medical Humanities on 21st-Century Undergraduate Medical Education Curriculum

The three schools studied are making intentional efforts to integrate medical humanities to meet the suggestions discussed in the Cooke and Macy Reports. The hypothesis was that if medical humanities were integrated into the content, then medical college faculty buy in would have occurred to begin to rethink the curriculum. The expectation was by using the humanities to teach medical content a greater breadth and depth of understanding would be evident from student questions and engagement in the content, and in turn the faculty would support the curriculum transformation.

The three schools aspired to meet a specified goal for reforming the curriculum. When School One revised its curriculum in the year 2000, it set an expectation for innovation and creativity to look at how to transform and create a model for quality

control. The expectation for continual improvement became part of the curriculum, resulting from the transition from large lecture style to small-group style curriculum formats. Simultaneously the social and behavior expectations grew into understanding how many of the social and behavioral components could be conveyed by using humanities in courses. School Two was founded on the expectation physicians would and could learn medicine through the use of the humanities. The new vice dean of education envisioned an expanded perception of the use of humanities to include communications, thus expanding the possibilities of how humanities could be incorporated into various curriculum formats. School Three has a new president who is pushing for the formal integration of humanities into medical education curriculum, thus expanding upon the existing extra-curricular programs.

Faculty who changed their teaching style from large lecture to small group work and who have intentionally incorporated aspects of the humanities to teach medicine are seeing positive results, as demonstrated in course discussions and the completion of assignments. Students are demonstrating their comprehension of the material covered by illustrating multiple levels of understanding. This finding is further illustrated by Michael Green, a physician and educator, who teaches medical students and incorporated student created comics into his course content: "Pre/post course assessments indicate that students believe creating a comic can significantly improve a variety of doctoring skills and attitudes, including empathy, communication, clinical reasoning, writing, attention to non-verbal clues, and awareness of physician bias."[232] The faculty members who have

[232] M. Green, "Comics and Medicine: Peering Into the Process of Professional Formation," *Academic Medicine,* Apr. 7, 2015 [Epub ahead of publication].

seen these results have published in medical education journals. They also continue to expand their use of integrating humanities into course work. These results then become success stories of the institution.

The success stories are important demonstrations of how the arts and science together provide students with the skills to become well-rounded physicians. The "well-rounded physician" has been described in this way by Edmund Pellegrino, one of the modern advocates for medical humanities to be taught in medical school:

> As physicians, when we are sought out to help our patients, we are professing to be competent and moreover that we will strive to use this competency to improve their total health, in all aspects of social, emotional, and physiological life. This is "a promise that we will not place our own interest first, that we will not exploit the vulnerability of those we serve, that we will honor the trust that illness forces upon those who are ill."[233]

The integration of the humanities helps future physicians gain confidence in understanding the complex elements of the human condition.

The three school leaders of the studied schools provided the encouragement, direction, and support for faculty to think, plan, and create course content for how the humanities assist in the teaching of medicine. All three schools, either through the medical humanities departments or deans' offices, have incorporated aspects of theatre, photography, drawing, music, literature, and visual art appreciation into curriculum to teach history of medicine, encourage improvisation and innovation, and teach the art of reflection. The leaders encourage their faculty to integrate medial humanities through the overall curriculum via retreats and other aspects of faculty development.

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[233] E. D. Pellegrino and P. C. Thomasma, *A Philosophical Basis of Medical Practice, A Philosophical Reconstruction of Medical Morality* (Oxford: Oxford University Press, 1981).

These experiences for faculty and students address the recommendation of student-centered learning and engagement as the humanities offer students a context for the abstract ideas and theories they are studying. The humanities provide the students another way to analyze and synthesize information. Teaching material in multiple formats benefits the learner, as it offers the opportunity to consider course content in different formats and provides for stronger retention of knowledge.

The humanities also offer a way to look at social and cultural aspects of the patient and community from which the patient comes. This is important for physicians to consider when making recommendations for continued care or for referrals. It is important for physicians and healthcare providers to ask their patients how they plan to follow directions and seek follow-up care and if follow-up care is within the realm of possibility given the patient's access to transportation and time away from work. Many healthcare organizations now offer various resources to patients and their families that were previously not available in terms of transportation options and after-hours services.

Aspects of the medical humanities curriculum at each school can be replicated at other schools. School Two has the integration across the curriculum model for three of the four years of medical school. School One and Two have specific courses predicated on medical humanities to understand aspects of medicine that could serve as models for replication.

The integration of medical school curriculum is not dependent upon the medical school having a department of medical humanities. While the department immediately conveys support for medical humanities, it can conversely be viewed as a stand alone, not an integral component of medical school curriculum. School One has strong medical

humanities department and when the curriculum changed in the year 2000, all courses were to have a medical humanities component. In the 2016 curriculum update the medical humanities is no longer a stated objective. The theory is that if the department exists, obviously it is important and medical humanities will remain central to the curriculum. If a department exists, the school implies that it has committed resources for it.

However, if cross-mingling and an interdisciplinary approach are utilized by curriculum planners, a department of medical humanities does not need to be the center of focus. Medical humanities are being integrated based on faculty comfort level and knowledge. If one's definition of humanities in medical school curriculum is about breadth and depth for medical students, then that—not building a department—becomes the focus. Medical students should know that civilizations have only evolved because medicine has evolved. Students should know there is a history of medicine in civilization, just as art has always depicted anatomy. Additionally, stories about surgeries depicted in art are accessible examples of how the humanities can easily teach aspects of medicine. A department may serve as a starting point, but is not totally necessary for faculty members to use the humanities in their course content.

Summary of the Observed Impact of Integration Technologies

The integration of technology into curriculum delivery or course content varied greatly at the three schools. The hypothesis pertaining to the use of technology was that if the schools incorporated technology into the curriculum, then a prototype exists for other schools to replicate. All three schools use sim labs and PBL to deliver curriculum;

however, none has seamlessly incorporated technology as fully as anticipated. Still, each school leader understands that technology is transforming classroom content, just as the students' process of gathering information is changing via the Internet. Amin Azzam, a medical educator and psychiatrist, wrote an article discussing the role of teacher and learner in today's climate of flipped classrooms and access to technology. He poses:

> Our modern digital revolution means that every individual who has access to information and wishes to learn can. Despite this availability of learning resources, actual learning will only be optimized if put into the framework of a meeting between teacher, learner, assessment and context. Since psychiatry claims to be the branch of the healing profession most attuned to the interpersonal relationship between healer and patient, it stands to reason that we should also be the branch of the health professional educators most attuned to the relationship between educator and learner. A reconceptualization of psychiatric education – and formal medical educational systems in general – as a mutual two-way learning exchange between participants will promote careers of lifelong learning, full of adventure and knowledge, worthy once again of the original fourteenth-century meaning of the word "doctor."[234]

It is essential for faculty and medical school leaders to work together and include student voices to understand the interstitial space between learning and guiding; faculty may have to rely upon students for technological assistance, as students rely upon faculty for knowledge assimilation and guidance.

Technology as a tool plays an integral part in curriculum reform efforts. The resources available through and the capabilities of technology have yet to be understood or fully garnered by all three schools, as time and finances to support the work are limited. The framework for understanding the three constructs of technology in regard to curriculum and curriculum planning has a solid footing at all three schools.[235] All three

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[234] Azzam.

[235] As defined by vice dean of education at School One: 1) Technology that enables the curriculum to be delivered; 2) Technology to be used for instructional purposes; and 3) Technology that assists in clinical practice and therefore students need to learn and utilize." Interview by author, Dec. 15, 2014.

schools are proficient at using technology for curriculum delivery. They all use a database system for collecting assignments and providing students with reading assignments and syllabuses. This information serves as a knowledge bank and archive of classes previously taught and provides longitudinal assessments of courses, material used, and evaluations. The challenge of the data repository is choosing what to collect and what to assess, as data mining requires human and fiscal capital. The tools are in place; the human capital for wrangling the data has yet to come to fruition.

School One integrated and remains flexible in assimilating how technology is used for instructional purposes. Students bring their own technology into the classroom, thus helping to drive the transformation, as the constant challenge is to understand the capacity and capability of technology in student-centered classes as well as in clinical care. School One works with students and faculty to utilize handheld technology with the development of various apps, as well as uses data available from patient care to see how students at all levels of their clinical interactions meet expectations set by the instructors. As the school is located on the west coast, the access and exposure to Silicon Valley may affect the school's ability to adapt.

Through assessing the three schools, it is apparent that the access to and practice of interdisciplinary instruction and learning influences the way that technology is used in the curriculum. School Two recognizes adjustment needs to occur regarding integrating technology into classroom instruction. One factor that may hinder the assimilation is location, as the school is not located on or near the university's main campus so there is not much exposure for faculty to view non-healthcare classes using technology. Schools

One and Three have greater opportunities for interdisciplinary interaction. Other examples of how technology can be used as a teaching tool speak to the socio-technological aspects of how the humanities are incorporated into the curriculum. School Two created two pilot classes in 2010 using the social media available at that time. The researchers found that while most of the students communicated at a professional level, there was a need to educate students about how to use social media to meet the expectation of professionalism in the socio-technological realm.

> To best reinforce safeguards and teach competencies, medical humanities training programmes would be wise to integrate coursework on social media use and conduct, not only into coursework – as was the case in the two case studies presented in this article – but also into professionalism curriculums.[236]

School Two uses technology creatively for instructional purposes by videotaping the families and patients who have chronic illnesses to better understand how the diagnoses affect daily living; this is intended to give students a more empathetic point of view.

Schools One and Two are demonstrating ways to engage students and focus on student-centered delivery through classroom instruction. School Three has created multiple ways to used technology for instruction. Individual faculty previously have driven technology integration, the expectation now is that all faculty will embrace how technology can help prepare physicians of the future. It has a mandate for transformation and the changes are underway for instructional technology. School Three created centers where technology is accessible for all healthcare schools within the university setting versus just being accessible for physician training. The central location of the centers

[236] Daniel R. George and Cheryl Dellasega, "Use of Social Media in Graduate-Level Medical Humanities Education: Two Pilot Studies From _____ College of Medicine," *Medical Teacher* 33, no. 8 (2011): e429-e434, accessed Apr. 14, 2013, *Academic Search Premier*, EBSCO*host*.

allow for developing IPE across schools thus reinforcing the idea of student engagement and formation of health care teams to deliver care by using technology driven instruction.

The leaders are the ones who help set priorities and expectations for how technology integration will be supported. For example, School Three's president seizes upon the importance of teaching and allowing creative thinking. He makes the case for how the increasing use of technology in the practice of medicine requires people with strong emotional intelligence to interpret the data and apply it accordingly.[237] These goals along with providing the resources are key components to technology integration.

Another consideration for technology integration is the physical facilities. The ability to re-wire buildings or the physical plant along with the capacity to transmit and receive information in all areas of the campus must be considered for successful integration. In the past, cellular phones interfered with the performance of medical equipment. The level of detail required to integrate the physical infrastructure of technology is vast. The ability to adapt the physical space also plays a key role in planning and resource management to successfully apply current and emerging technologies. All three schools have undergone major new construction as well as remodeling to meet the needs of technology for student and patient services.

Observations on Organizational Methods of Curriculum Change

The hypothesis for this content area was if curriculum change occurred with faculty buy-in and support then a model could be sustainable. Talking with curriculum

[237] http://leadership._____.edu/2013/11/11/how-academic-institutions-must-lead-the-transformation-of-health-care/.

leaders at the three schools made it clear that a tremendous amount of time and energy needed to be spent upfront and continuously to allow for buy-in to occur. The buy-in factors include time for faculty to become comfortable with the idea of change while concurrently providing direction or structure for how to go about changing. Simultaneously, the schools need to provide capital to support the changes. In terms of human capital, the ability to fund site visits to other schools or businesses to allow for personal development in understanding how change occurs in various settings provides an avenue for envisioning the ways in which courses can be taught differently. And, there needs to be a budget line for equipment capital to support the expected innovation.

Organizational change to create curriculum reform proved to be necessary in order to bring all of the constituents together to make the transformation a reality.

School One's use of the four frames was the most thoughtful and fully rounded model for organizational change because it clearly aligned the organizational vision with employees' vision and offered ways to support both in order to achieve the desired change.[238] The four frames met faculty and staff where they were and provided a framework of guidance to move people in the desired direction, while respecting change is a process that occurs at different stages. In March of 2015, the medical school announced a new department specifically to support the development of faculty:

> To maximize support of, and advocacy for, our educators, the School of Medicine is launching the new **Center for Faculty Educators**, an administrative unit designed to align the resources dedicated to our premier programs for faculty who are committed to teaching the next generation of health professionals.[239]

[238] These four areas must be considered: Setting vision, working through human resources aspects, political negotiations, and symbolic leadership and celebrations. Bolman and Deal.

[239] http://meded._____edu/new-center-faculty-educators-announced.

The development of this center demonstrates the medical school's continued commitment to investing in the framework established during the curriculum reform of 2000.

The organizational change process at School Two is bifurcated, as the new curriculum started under one vice dean and then interim leadership to be implemented by the current vice dean. The best way to define it is as an inherited model, as there was no one leader; much of the work was done by dedicated faculty serving on the curriculum committee. Thus, the major focus at first for the new vice dean was to align the curriculum changes with the 2016 LCME standards. The overarching change is to work with faculty and staff toward the vision "To guide the development and life-long learning of a humanistic physician who is adaptive, critical thinker, collaborative, and scholarly."[240] Changing the curriculum is only one aspect of the curriculum reform, as the faculty and staff within the educational portion of the medical school are essential for overall cultural change. There appears to be a generational dynamic at play: the first wave of physicians and medical educators reaching retirement age who had been inspired by the founding dean now work with a new generation of medical educators and physicians who may be open to hearing the stories and aligning with that mission and others who appreciate the history but want to innovate in their own way. This intersection of changing philosophies coupled with the new curriculum provides an interesting study in group dynamics.

School Three's leader follows a Steve Jobs format of think forward and then design back, while innovation is also unclear in setting direction. The overall direction is to change. While the notion of freedom is freeing, it also causes great uncertainty, as

[240] School Two administrator, interview by author, Mar. 2, 2015.

there are no obvious boundaries or borders. The president of School Three has said he wants people to create new ideas and then if needed the LCME standards can be aligned, versus changing to fit the curriculum into LCME guidelines. The process for staff and faculty can feel confusing. Carol Gernat, points out "structure contains chaos."[241] When people are in the process of change and there are no boundaries it can cause people to feel exhilarated, scared, or somewhere in between.

The three models for working through curriculum reform in an organizational change framework show the differences in development and may be applicable to any medical school.

Recommendations

The three schools apply similar themes of using the humanities to teach medicine as well as utilizing aspects of developing technology as ways to change medical school curriculum, but none of the schools using the humanities and technology together intentionally to bring about the transformation. There are many potential connects for integrating the humanities and technology. As technology has radically changed in the last five years in size, capability, and development of applications, this field has the potential to expand.

What is missing from the evidence currently is how the scientific aspects of learning medicine are taught with the integration of humanities in content. As mentioned earlier, one school uses jazz to teach students communication skills, but music has a strong correlation with mathematical and reasoning understanding. However, one can

[241] Carol Gernat, Dissertation Support Group, Drew University, Nov. 12, 2013.

make the supposition that since the study of arts increases high school students' test results for the SAT, it can only benefit medical students, also, as many of the skills the arts teach are transferable to other areas.[242] These are the types of studies that could be created in the future.

The humanities and technology could be incorporated into teaching medicine in many ways that have yet to be realized. Examples include intentionally creating curriculum around the humanities using technology formats and using standardized and simulated patients to test the ethical aspects of students' learning and training.

Much of the curriculum focus has been worded as professional identity formation, which includes how the student comports him or herself on a professional level and the ability to communicate with patients or their families in different settings. Recently a discussion among conference participants raised the point that teaching communication skills is not equivalent to using the humanities to teach medicine. One can teach communication skills without ever using the humanities. The cautionary tale was to avoid tying the humanities to the importance of improving communication, as the humanities offer more than how to communicate with a physician or a patient.[243] The humanities offer broad historical, anthropological, philosophical, and contemporary ways to discuss a myriad of topics, not exclusive to medical science.

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[242] Multiple independent studies have shown increased years of enrollment in arts courses are positively correlated with higher SAT verbal and math scores. High school students who take arts classes have higher math and verbal SAT scores than students who take no arts classes. Sandra S. Ruppert, "Critical Evidence: How the Arts Benefit Student Achievement," 9, National Assembly of State Arts Agencies, 2006, accessed Apr. 27, 2015, http://www.nasaa-arts.org/Research/Key-Topics/Arts-Education/critical-evidence.pdf.

[243] Discussion occurred among conference participants during Future of Medical Humanities in Medical Education panel at Trinity College's Long-Room Hub Conference, "Gender, Medicine and the Body" Dublin, Ireland, on March 14, 2015.

A major shift to university education happened as a result of both World War I and II. There was a push to begin to embrace science education and engineering. The introduction of pre-medical education to students in formative college years served as a way to advance scientific knowledge and prepare medical students to become scientists. Science was viewed as a panacea for providing the best care for patients. That focus did lead to the development of several cures and advancements in treating diseases that were once fatal and now have become to be viewed as chronic illnesses.[244]

The liberal arts, once the bedrock of university education, were pushed to the side as electives if one wanted to pursue a degree in medicine. This worked until very recently, when medical schools began to realize they needed students who had creative problem solving skills and were critical thinkers. Thus, a call for the return to liberal arts education is beginning to occur. In a parallel fashion disgruntled patients and physicians have called for the medical system to be fixed. Many physicians are reaching burn-out by the time they are in their mid-forties or early fifties because they are no longer satisfied with how they are able to practice medicine. They want to see patients; yet, due to reporting and other demands on their practice the physician-patient time has been severely reduced. Exposure to the humanities has the ability to re-engage them and help to define the importance of the patient in their daily practice. These ideals the humanities offer center back to the work of Dr. Edmund Pellegrino. He talked about the need to understand the word profession, to profess, and care for others. These are important elements to integrating humanities and technology, as by shifting to embrace science one-

[244] One example of this change from terminal to chronic was the development of kidney dialysis. Dialysis allows patients to live with renal disease, while prior to the 1960s if one received this diagnosis, there were no treatment options.

hundred percent, we have left out the human side of practicing medicine. Physicians and healthcare workers have to be schooled in the art and science of medicine. Currently physicians are trained in acute care settings. The majority of physicians will not practice in acute-care organizations, but rather in practice treating patients with chronic illnesses. Despite this, medical education does not teach them to manage people with chronic illness. It is important to teach physicians how to build relationships over time with the patients and fellow healthcare team members.

It is important to understand how policy and leadership are two major factors creating urgency for transformation. As much policy follows process the calls for education reform in the last fifty years has been a steady if not deafening drum beat. In order to effect change, policy has been created. The policy recommendations in the form of the LCME Standards and the MCAT are examples of how policy creation supports the work leaders have been advocating for resolving problems and transforming medical education to prepare students for future uncertainties. In many ways the policies are mandates help to remove barriers of resistance while also forcing change to occur. The emergence of data showing positive results stemming from learning materials via the humanities and science approach versus a science only approach will continue to help support how policy is integrated into specific schools.

Areas For Further Research

Further research should be conducted in several areas: medical humanities can be integrated across the medical school curriculum, and instructional technology applications to test students' comprehension have yet to be developed and fully utilized.

There are multiple applications for the humanities in clinical learning sites. Additionally, the humanities can help not only change the curriculum of the medical school but also serve as a way of changing the culture from solo practitioner to a member of a healthcare team.

Social expectations of how the incorporation of medical humanities into the curriculum using instructional technology could increase resilience and prevent burnout by changing the system and expectations. There have been calls to change medical education, as it is not humane and leads to burnout:

> Cultural factors also facilitate burnout in medical students immersed in a clinical environment that cultivates excessive detachment from patient and self, impairing self-care, damaging a sense of self, and impeding the development of a mature, well-integrated professional identity. The ethical implications of medical student burnout are also addressed. Finally, this paper suggests possible preventive and remediative strategies such as optimizing the learning environment as well as narrative approaches that promise enhancement of both individual and institutional well-being.[245]

In terms of medical education, there are pilot studies underway at residency programs to look at building resiliency and helping to change the structure of residency education. Dartmouth's Giesel School of Medicine has compiled a website devoted to resiliency training in medicine.[246]

At least one consulting business works with physicians who have reached burnout in their professional careers. Dike Drummond, a physician who left the practice of medicine, now works one-on-one with physicians to help them realign their personal goals with their profession. He argues people go into medicine to help others. However,

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[245] Jennings.

[246] "Geisel Resilience Curriculum Resources," Dartmouth, accessed Apr. 27, 2015, http://sites.dartmouth.edu/geisel-resilience-curriculum-resources/.

the structure of medical education, four years of following instructions of faculty, then 3-5 years of residency following orders, then obtaining first position all the while being repeatedly told "the patient comes first" and to "never show weakness" takes a toll on one's psyche. These two statements begin to shape how physicians live their lives, never taking care of themselves.[247]

Calls for changing medical education to prevent burnout align with several of the goals in the Cooke report for sustaining medical education. The three medical colleges in this study have made an organizational commitment to changing their undergraduate curriculum. Organizational change is not a quick solution. School One is still using its organizational change method fifteen years later. As new things come into the realm at School One leaders still evaluate recommendations against the set goals and visions and consider how recommendations are supported. The organizational change process is complex and ever evolving.

Successful organizational change provides faculty and staff with intentional processes and constant check-ins and updates on how their work aligns with the overall vision. Leaders need to be engaged with whether the process is still working. The work for reform and continued improvement to stay current with emerging trends demands constant support and acknowledgment.

[247] Dike Drummond, *Stop Physician Burnout: What To Do When Working Harder Isn't Working* (Collinsville, MS: Heritage Press Publications, 2015), 37-40.

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VITA

Full name: Elizabeth Anne Fehsenfeld

Place and date of birth: Grand Rapids, Michigan, USA, December 27, 1967

Parents' Names: John R and Joan M. Fehsenfeld

Educational Institutions:

School	Place	Degree	Date
Secondary: Hastings High School	Hastings, MI	High School Diploma	1986
Collegiate: Stephens College	Columbia, MO	Bachelor of Arts	1991
Graduate: Drew University	Madison, NJ	Doctor of Medical Humanities	2015