University of Missouri

Health Management & Informatics
School of Medicine

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November 21, 2019

CAHME
PO Box 911
Spring House, PA 19477

Dear CAHME / Canon Solutions America Award for Sustainability in Healthcare Management Education and Practice Selection Committee:

The application from the University of Missouri Department of Health Management and Informatics for the CAHME / Canon Solutions America Award for Sustainability in Healthcare Management Education and Practice is enclosed. Our application includes seven letters of support from the University of Missouri Sustainability Office (Raghu Raghavan), alumni (Amy Bernadt, Bryce Bogart), current students (Emmy Bonderer, Bethany Grell).

We meet the five eligibility criteria as follows:

1. The MHA program in the Department of Health Management and Informatics is accredited by CAHME. We have been CAHME accredited since Spring 1968.
2. We have not previously won the CAHME / Canon Solutions America Award for Sustainability in Healthcare Management Education and Practice.
3. Our curriculum integrates concepts of sustainability and social responsibility in healthcare management education and practice.
4. We agree to have representatives present at the 2020 ACHE Congress in Chicago for the CAHME Awards Ceremony on Sunday, March 22, 2020.
5. We agree to make a short video about our success.

Best Regards,

Suzanne Austin Boren

Suzanne Austin Boren, PhD, MHA
Associate Professor and Director of Academic Programs

1. Program overview and how the mission of CAHME is met

The Master of Health Administration (MHA) program in the Department of Health Management and Informatics (HMI) at the University of Missouri School of Medicine achieves the mission of CAHME by providing quality graduate healthcare management education with innovations in sustainability and social responsibility. Our graduates are capable of leading health care organizations effectively and efficiently to improve the health of populations. There are currently 106 MHA students actively enrolled.

Educating Builders of a Sustainable Health System HMI is a leader in health administration education, research, and service. HMI offers master's degrees in health administration (MHA) and health informatics (MS), as well as graduate certificates in health informatics, informatics for public health, and health ethics. Students pursue master's degrees on campus through our residential program or in a hybrid on-campus/on-line format through our executive program. HMI researchers secure federal funding to pursue their work. Quality improvement, health informatics, health outcomes, population health, and ethics are top strengths at the MU School of Medicine.

Professionals Prepared to Achieve Success This CAHME-accredited MHA program prepares professionals to meet the challenges of a changing health care industry. The curriculum is competency-based using a modified NCHL model. Students obtain the necessary knowledge and skills to be successful in the dynamic health care market through educational methods shown to be effective with adult learners. Many students elect to pursue a dual degree or a graduate certificate in health informatics concurrently with their MHA degree. Courses provide students with strong grounding in finance, accounting, economics, human resources, managerial epidemiology, health informatics, and Lean Six Sigma Quality Improvement. The MHA program builds on this foundation with an integrated curriculum focused on managing complex organizations within integrated health systems. Students develop applied knowledge in organizational change, strategic human resources, process improvement, interdisciplinary team management, and financial risk management. Graduates take leadership positions in medical group practices, managed-care firms, integrated health systems, long-term care organizations, hospitals, and health information technology organizations in urban and rural environments.

2. Sustainability is defined as a combination of cultural competency, community involvement, environmental focus, and accessibility. Explain how your Program manifests sustainability ideals using:

a) Required and elective courses

Sustainability Integrated throughout Curriculum All health systems face dual challenges of increasing demands (e.g., treat more people with more complex illness, higher expectations, and using more expensive technologies) and diminishing resources (relatively fewer dollars and workers) which leads to unsustainability. In other words, these key challenges are: demographic driven demand challenges, quality and safety challenges, technology driven demand challenges, and funding and workforce challenges. In addition to physical material and energy, resources for healthcare systems include trained staff, patients, clinical knowledge, capital, and data. If the healthcare system is to succeed in the coming decades in an environment with increased demand and uncertain resources, it will do so because of well-equipped professionals who have explicitly designed and implemented sustainable healthcare systems. The concepts, issues, and tools that all health care professionals need to be aware of as we work towards sustainable health systems are integrated throughout the MHA curriculum in the following courses:

- First Semester – Administration of Health Care Organizations (knowledge management, quality improvement), Managerial Epidemiology (applications of epidemiology to health services planning, quality monitoring, policy development, system development, and finance);
- Second Semester – Managing Human Resources in Health Care Organizations (strategic and effective use of healthcare personnel, retaining qualified staff), Health Economics (cost-effectiveness, cost-benefit, and cost-utility analyses; improve value while trying to cut the waste; return on investment by improving quality of care), Decision Making for Health Care Organizations (Lean Six Sigma Green Belt Certification, Excel, Access, QI/PI tools);
- Summer – Field Experience in Health Management and Informatics (internship);
- Third Semester – Introduction to Health Informatics (leveraging the EMR for quality improvement, patient safety); Healthcare Finance (development and utilization of various tools within a complex health care industry, value-based payments)

- Fourth Semester – Decision Support in Health Care Systems (use of decision support technology); Capstone Projects

- Electives – a Graduate Certificate in Health Ethics can be pursued in the elective slots

Students Engage in the Learning Process Faculty use a variety of teaching and learning approaches to develop a competence (knowledge, skills, and attitudes) in our students. The use of case studies, scenario analysis, student presentations, individual and team projects, major papers, critiques of other students' papers, student-led class discussions, and capstone project presentations are highlights. The competencies that support the development of professionals who are able to build and work in sustainable health systems are emphasized throughout the curriculum: performance measurement and improvement, team leadership, project management, change leadership, and systems thinking. These skills are learned through a variety of activities including in-depth discussion, hands-on application of theory to problems, case analyses, and team projects/presentations. These learning activities enable faculty to observe students demonstrating the desired competency levels. Continual reassessment of courses and focusing on overall program goals and objectives enhance our ability to keep abreast of changes in the health care system and higher education.

b) Alumni sharing their knowledge and practical experiences with current students

Engaged Alumni HMI has recognized the importance of engaged alumni since the program's inception. Alumni provide guidance and support through multiple channels. Alumni routinely recruit and refer highly qualified students. Routinely, over 75% of our Executive MHA students are referred by colleagues who are alumni or current students in the program. Working from their knowledge of the program, they refer potential students who are focused, persistent, curious, and willing to work. As students move through the degree program, alumni continue sharing their knowledge and experience by serving as one-on-one mentors for students. The relationship developed through this mentorship can also support a fledgling career. Many of the summer internships are provided by alumni. This strategy allows alumni to provide students with practical, hands-on transfer of knowledge through supervised experience. Alumni also serve on oral comprehensive exams.

Generous Alumni Alumni offer their time and experience in healthcare quality improvement, serving as forum speakers, attending our annual Fall Institute in Columbia, networking during ACHE social gatherings and dinner in Chicago, and other continuing education and networking events in St. Louis, Kansas City, Springfield, and Omaha. Guest lectures are a valuable resource much requested by students; most courses incorporate more than one such speaker. Alumni participate in the HMI Alumni Association and serve on the HMI Advisory Board. An alumni newsletter sharing the achievements and wisdom of our alumni and updates from students and faculty is distributed via email each quarter. Alumni are also surveyed at various points throughout their professional careers. These opportunities are designed to guide our degree programs, especially in terms of practical skills that graduates need to succeed in the industry. Recent program additions fueled by alumni input include the Lean Six Sigma Certificate and the Project Management Institute Certification opportunities that are embedded in courses.

c) Experiential opportunities like internships, fellowships or residencies

Internships and Fellowships Recent internship placements include: BJC Center for Clinical Excellence, Brigham and Women's Hospital Informatics, Yale New Haven, Guthrie Health, University of California San Diego Health, Northwestern University, and University of Missouri Healthcare. Recent fellowship placements include: Trinity Health, The University of Michigan, Mayo Clinic Health System, Oregon Health and Science University, Kaiser Permanente, Duke University, Nationwide Children's Hospital, and Vizient.

Capstone Projects All MHA students complete capstone projects addressing applied problems in health care organizations. Typically acting as consultants to external client organizations, residential student teams develop data-collection protocols, analyze data, draw conclusions, and develop recommendations using research methods and tools including process analysis and quality improvement techniques such as PDSA, Lean, and Six-Sigma. An example of this work, the Randolph County Caring Communities Project (a community level, sustainable, health and healthcare delivery system) is available in the appendix. Executive students design and carry out individual capstone projects, many of which increase sustainability of the organizations where they work. Examples include:

1. Assessment of pre-operative education before elective surgery
2. Audits with feedback as an independent intervention to create positive to steam change
3. Changing culture within acute care hospital
4. Clinical operations: evaluating no-show appointments
5. Developing preferred and collagen regimen's in an era of value-based reimbursement
6. Exploration of current case management practices
7. Hemoglobin A-1 C management within a next GEN accountable care organization
8. ICU readmissions: A study of the incidence in common characteristics patient returned to the intensive care unit after being discharged
9. Impact the point of care testing in emergency department
10. Interprofessional education simulation dosing for pre-licensure healthcare students

3. Explain how your University is committed to sustainability initiatives.

University of Missouri's mission and values drive us to lead in demonstrating sustainability stewardship. This role is embraced system wide by providing a healthy and safe learning environment for students, faculty, and staff. Each department regularly evaluates policies and practices in order to adopt and continuously improve sustainable practices. This commitment has led to an ambitious program of sustainability that includes the core elements of our existence at this university: teaching and research, natural resources, energy, recycling, construction, supply chain, food, and transportation. The University of Missouri's Sustainability Office facilitates the collaboration among students, faculty and staff that is necessary to achieve the sustainability principles of social equity, environmental stewardship, and economic prosperity in our campus operations, academics, and research. Sustainability practices at the University of Missouri have resulted in the a **Gold Rating** from the Sustainability Tracking, Assessment and Rating System (STARS) which is the premier benchmarking system for higher education sustainability in the United States. Details of the University of Missouri's commitment to sustainability are available in the letter of support from Mr. Raghavan MU Sustainability Manager, the supplemental materials following this application, and the Sustainability Office website (https://sustainability.missouri.edu/).

University of Missouri

Sustainability

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November 15, 2019

Commission on Accreditation of Healthcare Management Education (CAHME)
PO Box 911
Spring House, PA 19477

Dear CAHME / Canon Solutions America Award for Sustainability in Healthcare Management Education and Practice Selection Committee:

The University of Missouri embraces its role in providing a healthy and safe learning environment for its students, staff, and faculty. Consistent with MU's mission and values, we are committed to leadership in demonstrating local and global sustainability stewardship. MU recognizes the increasing need for policies and practices that reduce greenhouse gas emissions and has signed the American College and University President's Climate Commitment with the goal of making the MU campus carbon neutral. Each unit or department within the University is expected to evaluate current policies and practices on a regular basis with the goal of adopting and improving environmentally sustainable practices. Further, MU has undertaken an ambitious program of sustainability that includes, but is not limited to, the following actions:

- Incorporating sustainability and social responsibility in the teaching curriculum; researching, testing, and implementing new sustainability initiatives; and disseminating effective sustainability practices.
- Taking proactive steps to preserve, protect, and renew natural resources, both locally and globally, thereby minimizing anthropogenic harm to the environment.
- Identifying and utilizing environmentally friendly energy resources and employing a dynamic and proactive energy-conservation program.
- Minimizing waste generation, recovering recyclable materials and safely managing necessary waste disposal.
- Observing sustainable best practices in campus construction and procurement.
- Researching and promoting sustainable practices in the growth, management, and transportation of food.
- Promoting clean, efficient, and healthy transportation for all students, staff, and faculty.

The University of Missouri's Sustainability Office seeks to ingrain sustainability principles of social equity, environmental stewardship and economic prosperity while integrating campus operations, academics and research. This is done through collaboration with students, faculty and staff to provide support, resources, education and leadership opportunities that lead to an empowered community willing to address sustainability issues on campus and beyond. The University of Missouri offers undergraduates 203 sustainability courses to choose from and over 1,000 courses that include sustainability content. For students interested in graduate school, the university offers a total of 138 sustainability courses and 754 courses that include sustainability content. Mizzou's Sustainability Office is the focal point and catalyst for sustainability related operations, education, research, activities and planning on a campus that implements the Missouri Method in serving as a living laboratory for sustainability.

The University of Missouri has engaged in sustainable construction practices and increased renewable energy use. MU has 5 LEED Platinum Buildings and 6 LEED Gold Buildings. MU has substantially reduced its use of coal as a fuel to heat and power its campus. A 73% reduction in coal has been achieved and replaced with a balance of natural gas and sustainable wood residue biomass. MU's investment in

renewable energy has been significant. MU's renewable portfolio of biomass, wind, and solar has now exceeded 42% of campus energy use and is forecasted to exceed 40% this year compared to 1% in 2008. In the fall of 2017, the EPA Green Power Partnership recognized MU as a national leader in the development and application of renewable energy to power our campus.

Examples of additional sustainable practices currently in place at the University of Missouri are:

- Climate Action Plan
- Student Ambassadors
- Tiger Tailgate Recycling
- Tiger Treasures
- Water Bottle Recycling
- Tree Campus USA
- Bee Campus USA
- Mizzou Botanic Gardens Pollinator Initiatives
- George Washington Carver Project
- Bike Resource Center
- Mizzou Bike Share
- Bus Routes (Tiger Line, COMO Connect)
- Vehicle Sharing and Carpooling (Enterprise Care Share, ZipCar)
- Agricultural Research Centers
- Tiger Pantry
- Farmers' Markets

MU's various sustainability practices have resulted in the a Gold Rating from the Sustainability Tracking, Assessment and Rating System (STARS) which is the premier benchmarking system for higher education sustainability in the US. It is exciting to know that sustainability concepts and opportunities for optimizing the responsible use of human, natural, and capital resources are being provided in the healthcare administration graduate curriculum.

Sincerely,

Srinivasan (Raghu) Raghavan
Sustainability Manager

November 21, 2019

Commission on Accreditation of Healthcare Management Education (CAHME)
PO Box 911
Spring House, PA 19477

Dear CAHME/Canon Solutions America Award for Sustainability in Healthcare Management Education and
Practice Selection Committee:

I am writing in support of the University of Missouri's Health Management and Informatics Program and their
application to the CAHME I Canon Solutions America Award for Sustainability in Healthcare Management
Education and Practice. As a 2010 graduate of the Residential Masters in Health Administration program and
the current Health Management and Informatics Alumni Organization (HMIAO) Board President, I can attest to
the program's dedication to preparing leaders to think critically about the world around them and to participate
in the quality improvement process to improve and sustain health care for future generations.

The curriculum offered by the HMI program provides a multitude of opportunities for students to engage in
quality improvement work. Having the informatics component integrated into both the MHA and MHI
programs sets the HMI program apart because of how intertwined quality improvement efforts and informatics
have become within the healthcare sector. Courses such as Decision Making for Health Care Organizations and
Decision Support in Health Care Systems provide the basis for all students to participate in the quality
improvement process. They are then able to further apply the theory and the processes they have learned
through their coursework in their Summer Field Experience and their Capstone Projects, many of which have a
strong focus on quality improvement. The program also encourages student participation in case competitions
and interdisciplinary scenarios that allow them to apply what they've learned along with other students in
different health care disciplines.

Furthermore, as President of the HMIAO, I continue to see more alumni of the program become involved with
the alumni association and participate in the students' growth after graduation. We are fortunate to have
outstanding alumni in many health care related fields. As alumni work with students either through mentoring,
internships, capstone projects, interview prep, or professional development they are able to prepare those
students with real world experiences and case studies from the front lines. It's no secret that the development
of quality improvement skills is vital to a health care leader's success in today's world where we see an
increased focus on quality outcomes as it relates to not only patient safety and satisfaction, but also
reimbursement. The HMI program is preparing students to tackle these challenges immediately upon
graduation.

Through forward thinking efforts to incorporate the concepts, issues, and tools that health care professionals
need to work towards sustainable health systems in all aspects of the curriculum as well as engaging alumni
who are actively participating in and leading efforts in their respective organizations, the Health Management
and Informatics program will continue to thrive and produce graduates who are overwhelmingly prepared to
face the challenges that health care leaders will face in the coming years. I wholeheartedly offer my support of
the program's application for the CAHME I Canon Solutions America Award for Sustainability in Healthcare
Management Education and Practice.

Sincerely,

Amy Bernadt, MHA
HMIAO Board President
Director of Implementation
Ludi, Inc.
(573) 823-8555
abernadt@ludiinc.com

November 20, 2019

CAHME
PO Box 911
Spring House, PA 19477

Dear CAHME Excellence Award Selection Committee,

I am very humbled to write this letter of support to CAHME regarding the Canon Solutions America Award for Sustainability in Healthcare Management Education and Practice representing the University of Missouri's Health Management and Informatics (HMI) Department. As a recent alum of the Master of Health Administration Program, I can attest to the wonderful learning environment the HMI Department has in place for students, the challenging curriculum present to prepare students for leading within the healthcare industry, and the immense number of outside-the-classroom opportunities for personal and professional growth. Through these opportunities, I have applied my skills related to quality improvement as a member of the University of Alabama-Birmingham case competition team, as an intern at Saint Luke's Health System, as a student in Decision Making for Health Care Organizations and other relevant courses, and share my knowledge on the Crossing Borders Excursion with students from the University of Bayreuth in Bayreuth, Germany. I now apply these same skills as an administrative fellow at Indiana University Health.

Sustainability and quality improvement education have been staples of my graduate school experience. The curriculum employs the Managerial Epidemiology: Population Health Management course in the first semester of the MHA program. This course includes a semester-long project focused on formulating creative initiatives to solve a real-world problem through sustainability and quality improvement. We are able to transition the skills learned in Epidemiology to our Decision Making for Health Care Organizations course. Through this Lean/Six Sigma based course, I was able to obtain my Lean Six Sigma Greenbelt certification. This provided a wealth of knowledge for me and other students to discuss throughout the internship and fellowship interview processes. Further, the depth of exposure to Microsoft Excel & Access along with other vital programs relating to quality improvement was fundamental to my success in my administrative internship. I know so many other MHA students share my sincere belief that this is such an instrumental course in our curriculum.

Through the ability to obtain a Graduate Certificate in Health Ethics, HMI students have an unapparelled advantage in understanding how ethical, sustainable practices play a role in better outcomes for communities. The HMI Department, too, is consistently seeking out internal improvement through conversations with students. HMI asks several times throughout the two or three years within the program for input and feedback. Moreover, our professors and administrators
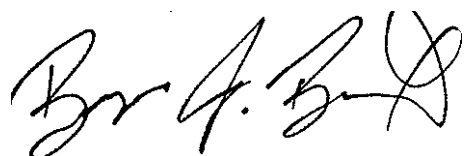
operate with a well-known "open-door" policy. This proves HMI isn't only dedicated to teaching quality improvement, but practicing it on a daily basis to ensure students are receiving the highest quality education possible. Additionally, this is a prime example of HMI's commitment to sustainability and ensuring a sustainable culture in order to allow the department to succeed for years to come.

While I have gained from HMI's curriculum, I have also had many wonderful opportunities to grow and learn from outside-the-classroom experiences. As a first-year student, I was a team member on the University's University of Alabama-Birmingham case competition team. This opportunity allowed me to work with two second-year students and build our case for a struggling rural community hospital. I was able to utilize the knowledge I had built, but more importantly, was able to learn from the two second-year students and their experiences in quality improvement. The unplanned mentorship that accompanies opp01tunities like this one is not isolated within the HMI Department. There are a multitude of experiences that allow students to create professional and personal relationships that will last long beyond our two years in graduate school.

Expanding from within our department's walls, HMI students have the opportunity within their years in the HMI Department to travel to Bayreuth, Germany for an excursion with students from the University of Michigan and University of North Carolina-Chapel Hill. Sustainability and quality improvement initiatives were at the center of this excursion. As the health care industry continues to evolve throughout the world, sharing thoughts and ideas and having an expansive network is going to be all-the-more important. This excursion allowed several HMI students to begin building this network. Upon our return, we were able to integrate our new ideas and experiences into the classroom and begin new conversations - enhancing our already diverse learning environment.

For the reasons stated above, I am so very proud to be an alum of this program. The University of Missouri's Health Management and Informatics Department is undeniably worthy of the CAHME Canon Solutions America Award for Sustainability in Healthcare Management Education and Practice. I, along with the hundreds of alumni around the world, have greatly benefitted from the University of Missouri's sincere dedication to education surrounding sustainability and quality improvement.

Best wishes,

Bryce J. Bogart
Administrative Fellow
Indiana University Health
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Health Management & Informatics
School of Medicine

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November 19, 2019

Commission on Accreditation of Healthcare Management Education (CAHME)
PO Box 911
Spring House, PA 19477

Dear CAHME / Canon Solutions America Award for Sustainability in Healthcare Management Education and Practice Selection Committee,

I am writing this letter in support of the University of Missouri's Master of Health Administration Program with their application for the CAHME / Canon Solutions America Award for Sustainability in Healthcare Management Education and Practice. As a second-year student, I fully understand the quality of education and unique learning experiences I am receiving. Our program's commitment to education through both coursework and professional development has led me to pursue challenging and meaningful advancements in my career post-graduation.

The curriculum of the Master of Health Administration program supports students from diverse backgrounds, who have a wide range of career goals. With every course contributing to the development of its students, the University of Missouri's program places an emphasis on quality improvement courses and their importance for social and economic sustainability in healthcare. For example, the required course titled Decision Making for Health Care Organizations, provides students with Lean/Six Sigma principles and the opportunity to obtain a Green Belt Certificate through the Institute of Industrial and Systems Engineers. The course instructor is a hospital director who routinely applies lean concepts through project work. The growth of students after this course leads them into incredibly successful internship positions.

Going forward into the second and final year of the HMI program the focus shifts towards the maturation of their students and their healthcare administrative skillset. A valuable course taught in the second year is the Executive Management Study. This is a yearlong course that allows students to establish relationships with community healthcare leaders, learn about problems affecting healthcare organizations, and use strategic and innovative techniques to provide sustainable solutions. In congruence with this course, students also take a Project Management course. This provides advanced instruction into how to analyze, allocate, manage, assess, and evaluate project performance. The Summer Internship, Healthcare Forums, and Fall Institute give students opportunities to interact and learn from leaders working hands-on in quality improvement departments. Students can serve in leadership roles at the with MedZou Community Health Clinic that stress sustainable quality improvement initiatives – including but not limited to the Director of Business Operations, Clinic Manager, and Quality Improvement Leader.

As you can see, all of these attributes exemplify the Master of Health Administration program's commitment to sustainability and quality improvement excellence in their student's education and leadership development. The unique curriculum and opportunities offered greatly benefit students and ultimately the healthcare industry. I have no doubt that their increased emphasis on sustainability and quality improvement and its application into healthcare is what made me stand out in order to obtain a competitive Administrative Fellowship. With that, I am incredibly humbled and grateful in being able to recommend the Master of Health Administration program at the University of Missouri with the highest regard for the CAHME / Canon Solutions America Award for Sustainability in Healthcare Management Education and Practice.

Sincerely,

Emmy Bonderer
Master of Health Administration Candidate 2020
President 2019, HMI Graduate Student Association

November 17, 2019

Commission on Accreditation of Healthcare Management Education (CAHME)
PO Box 911
Spring House, PA 19477

Dear CAHME / Canon Solutions America Award for Sustainability in Healthcare
Management Education and Practice Selection Committee:

Being invited to provide a letter of support on behalf of the Department of Health
Management and Informatics at the University of Missouri's School of Medicine is an
honor. As a first year, dual-degree seeking executive student pursuing a Master of
Health Administration as well as a Master of Science in Health Informatics, I will
enthusiastically confirm the education I am gaining is already being applied within
healthcare. I am currently employed as a Senior Coordinator in Graduate Medical
Education at the University of Kansas Medical Center and have found the instruction
from each course to be easily applicable and highly beneficial to my work. As a
student, I am involved in efforts to not only genuinely understand the need for quality
improvement and sustainability initiatives but to comprehend the proper tactics for
approaching the issues within healthcare. As an employer, I am prepared to zealously
apply these skills.

In the first semester courses alone, I experienced a common theme of identifying
opportunities for quality improvement initiatives. The courses, Introduction to the US
Health Care System and Administration of Health Care Organizations, provided a
high-level view for the current state of healthcare and how it is managed. Both the
teaching, and the comradery of the executive class gave me an opportunistic
perspective for change. This stimulated an eager anticipation for the following courses
and to study the methods for applying this change.

I completed the Decision Making for Health Care Organizations course. This course
prepares students to obtain a Lean Six Sigma Green Belt certification through the
Institute of Industrial and Systems Engineers. The techniques, theories, and tools are
taught in such a way that they are easily attainable and applicable for quality
improvement. Not long after learning about how to use a Failure Mode and Effects
Analysis (FMEA), I was contacted within my workplace to participate in an initiative
using this same tool. Without this course, I would have been of little help in the
situation-confused about the purpose and application of an FMEA-but because of the
opportunity and education through this course, I am enthusiastically prepared to assist
the initiative.

The Department of Health Management and Informatics is shaping, developing, and
cultivating my drive for quality improvement and sustainability within healthcare. I am
encouraged by the academic opportunities to tackle any and all initiatives in which I

can be involved. I am inspired by my diverse classmates, actively working in numerous fields. I am equipped by my teachers to continue implementing the skills I am learning.

I have and will continue to recommend the Department of Health Management and Informatics at the University of Missouri to my colleagues. It is an excellent program dedicated to preparing the healthcare leaders of tomorrow with the skills necessary for successful quality improvement in a sustainable healthcare system. With enthusiasm, I highly recommend the University of Missouri's Health Management and Informatics Program for the CAHME I CAHME / Canon Solutions America Award for Sustainability in Healthcare Management Education and Practice.

Sincerely,

Bethany Grell
MHA & MSHI Candidate 2020
HMI Department - School of Medicine
bethanygrell@gmail.com

Supplemental Information for the CAHME / Canon Solutions America Award for Sustainability in Healthcare Management Education and Practice from the University of Missouri, Department of Health Management and Informatics

1. Program Descriptions
   a. Master of Health Administration Degree (MHA)
   b. Master of Health Informatics Degree (MS)
   c. Graduate Certificate in Health Informatics
   d. Graduate Certificate in Health Ethics
2. Course Syllabi
   a. HMI 7430 Introduction to Health Informatics
   b. HMI 8571 Decision Support Systems for Health Care
   c. HMI 8573 Decision Making for Health Care Organizations
3. Learning Results shared at the 2017 AUPHA Annual Meeting
   a. Integrating Analytics and Lean Six Sigma Certification within a Health Care Improvement Course
   b. The Flipped Classroom: Practices and Opportunities
4. Randolph County Caring Communities Partnership: a community level, sustainable, health and healthcare delivery system
5. Sustainability Office, University of Missouri (https://sustainability.missouri.edu/)
   a. Sustainability Efforts on Campus
   b. Mission, Vision, Core Functions
   c. MU Sustainability Policy
   d. Campus Resources
   e. Education and Research
   f. Sustainability Reports
   g. Sustainability Tracking, Assessment and Rating System (STARS) - GOLD
   h. Campus and Community Involvement

MU Health Management and Informatics

Master of Health Administration Degree

The nationally ranked Health Management program, which culminates in the Master of Health Administration (MHA) degree, prepares professionals to meet the challenges of a changing health-care industry. The traditional on-campus and executive two-year programs have been accredited by the Commission on Accreditation of Healthcare Management Education. Our program is a professional multi-disciplinary program within the MU School of Medicine.

Curriculum

The Master of Health Administration (MHA) degree core curriculum integrates fundamental management concepts and health care applications. Specific competency areas include: quantitative analysis; health economics; financial management; health policy; planning and marketing; and health system organization and development. All candidates must complete 54 hours of coursework for the residential students and 42 hours for the executives.

Students may also pursue a dual, three year MHA/MS in Health Informatics degree, which requires a total of 72 credit hours for residential students and 57 credit hours for Executive students.

Career Opportunities

Tens of thousands of people work in health management positions ranging from small local companies to some of the largest international organizations. After requisite experience, administrators assume leadership positions as hospital CEOs, managed care executives, partners in consulting firms, and officers in major healthcare companies. MHA graduates are also sought after by integrated health systems, physician group practices, corporate health systems, home health agencies, hospices, public health agencies, and many others.

Internships

During the summer between the first and second year of the program, residential students complete a 12-week internship in an approved health organization under the guidance of a qualified and motivated preceptor. Internships allow students to apply knowledge and develop skills as they increase their understanding of the complex relationships within health-care organizations. Student interns usually are paid a monthly stipend by the host organization.

Application/Admission

Students applying for the residential program will begin in the fall semester and those applying to the executive begin each spring. We have a rolling enrollment, which means there are not deadlines. However, we suggest having applications in by March 1 for the residential students, and October 31 for the executive.

For more information

Website: hmi.missouri.edu

Further Information: Contact Veronica Lemme at (573) 884.0698 or Email: lemmev@health.missouri.edu

MU Health Management and Informatics

Master of Health Informatics Degree

The University of Missouri, home to the world's first computerized laboratory system, has been a leader in health and biomedical informatics research since the 1960s. The University began offering training in health and biomedical informatics in the 1970s and counts among its alumni some of the leading figures in the field. Today, that tradition of excellence continues in the Master of Science in Health Informatics Program (MSHI) offered by the Department of Health Management and Informatics.

Program Highlights

Course work combines classes in computer science, health and biomedical informatics, and health management. The core HI curriculum includes courses in health information systems; information storage, retrieval and management; and research methods and outcomes analysis. Special areas of concentration include electronic health-care records, information systems for managing health, telemedicine, and bioinformatics.

Students may also pursue a dual, three year MHA/MS in Health Informatics degree, which requires a total of 72 credit hours for residential students and 57 credit hours for Executive students.

Career Opportunities

The residential HI program prepares students to pursue careers in a wide range of healthcare organizations and related settings, such as hospitals and clinics, pharmaceutical firms, health insurance companies, research labs, governmental and non-governmental agencies, and beyond. The program focuses on understanding, designing and developing information technologies to transform and integrate health systems in the 21st century. The program fosters students' research interests in health and biomedical informatics.

Application/Admission

Students applying for the residential program will begin in the fall semester and those applying to the executive begin each spring. We have a rolling enrollment, which means there are not deadlines. However, we suggest having applications in by March 1 for the residential students, and October 31 for the executive.

Each Fall and Spring, up to 30 students are accepted into the Health Informatics Program.

For more information
Website: hmi.missouri.edu
Further Information: Contact Veronica Lemme at (573) 884.0698 or Email: lemmev@health.missouri.edu

MU Health Management and Informatics

Graduate Certificate in Health Informatics

Designed for physicians, nurses, managers, information system designers, consultants, and others committed to the application of information technology for improving the quality, safety, and efficiency of health services

Offered in both the Executive and Residential format of 12 Credit Hours

Graduate Certificate in Health Informatics

Provides learners with the skills necessary to participate in the selection, use, and evaluation of information technology applications throughout the health services industry

Required Course (3 Credits)

HMI 7430 - Introduction to Health Informatics

Elective Courses (Choose 3 for a total of 9 Credit Hours)

HMI 7440 - Health Information Technology
HMI 7566 - HIPAA, Social Media, and the Ethics of Health Information
HMI 8435 - Information Security, Evaluation, and Policy
HMI 8437 - Data Warehousing and Data/Text Mining for Health Care
HMI 8441 - Biomedical and Health Vocabularies and Ontologies
HMI 8443 - Enterprise Information Architecture
HMI 8550 - Health Data Analytics
HMI 8571 - Decision Support in Health Care Systems
HMI 8610 - Consumer Health Informatics (Residential only)
HMI 8870 - Knowledge Representation in Biology and Medicine (Residential Only)

For more information

Application Information: hmi.missouri.edu/certs
Costs & Financial Aid: http://gradstudies.missouri.edu/financial/
Further Information: Contact Veronica Lemme at (573) 884.0698 or Email: lemmev@health.missouri.edu

MU Center for Health Ethics
University of Missouri

Graduate Certificate in Health Ethics: Expanding the ethical professionals network

Offers advanced training and greater understanding of ethical decision making ideal for health professionals at all levels.

100% Online or Campus. 12 Credit Hours.

Graduate Certificate in Health Ethics

The Department of Health Management and Informatics in partnership with the MU Center for Health Ethics offer the Graduate Certificate in Health Ethics with a focus on exceptional instruction, practical knowledge, and a broad array of ethical focus areas.

Required Courses (6 credits)

HMI 7564 – Health Ethics Theory (3 credits)
Covers topics in metaethics and normative ethics with a focus on how they relate to situations and controversies in healthcare; includes the status of moral norms, utilitarianism, deontology, distributive justice, cultural relativism, methods of ethics case workup, and ethics consultations and committees.

HMI 8565 – Healthcare Ethics (3 credits)
Analysis and discussion of topics in clinical ethics such as abortion, euthanasia, stem cell research, healthcare resource allocation, and relationships between clinicians and patients.

Elective Courses (6 credits)

HMI 7566 – Health Informatics Ethics (3 credits)
HMI 7567 – Health Organizational Ethics (3 credits)
HMI 8574 – Health Care Law (3 credits)
HMI 8575 – Health Policy and Politics (3 credits)
LAW 5380 – Bioethics Seminar (2 credits)
LAW 5615 – Health Care Law: The Doctor-Patient Relationship (3 credits)
SOM 354 – Problems in Medical Ethics (5 credits)

For more information

Application Information: hmi.missouri.edu navigate to "Prospective Students" →"Certificates"
Costs & Financial Aid: http://gradstudies.missouri.edu/financial/
Further Information: Contact Veronica Lemme at (573) 884.0698 or Email: lemmev@health.missouri.edu

Introduction to Health Informatics
HMI 7430 – Fall 2019
705 CS&E Building
Department of Health Management and Informatics
School of Medicine, University of Missouri

Sue Boren, PhD, MHA
borens@health.missouri.edu
573-882-1492

Course Description

Examines clinical, research, and administrative applications of information systems in health services delivery. Provides an introduction to important topics in health informatics, including clinical data (collection, storage, and management), electronic health record systems, decision support systems, computerized order entry, telemedicine, and public health applications, consumer applications, evidence based practice, data science and analytics, patient safety, quality, privacy, and security.

Course Credit

Three credit hours

Prerequisites

Graduate standing or permission of the instructor

Day, Time, and Location

Monday and Wednesday, 2:00 PM to 3:15 PM, CS&E 705

Office Hours

Please contact the instructor (by phone, email, or in person after class) to schedule an appointment.

Required Reading

- Ramona Nelson, Nancy Staggers. Health Informatics: An Interprofessional Approach 2nd edition Elsevier ISBN: 978-0-323-40231-6

- Other readings as listed on the course Website.

Optional Materials

- Readings and links as stated or available on the course Website.

Course Objectives

Matrix of Course Objectives, Knowledge Areas, Competencies, Assignments, and Evaluation			
Course Objectives	**Course Knowledge Areas**	**NCHL Competencies and Levels***	**Course Assignments and Evaluation**
1. Comprehend basic topics in health informatics	All course areas	Information seeking (Level 2)	Self-assessments Reading Quizzes Electronic poster presentation Activity exercises Case analysis Class discussion and participation
2. Comprehend key computer systems in clinical healthcare settings	All course areas	Information seeking (Level 2)	Reading Quizzes Electronic poster presentation Activity exercises Case analysis Class discussion and participation
3. Use an EMR system to document a clinical encounter	EMRs and EHRs Supporting Clinical Decision-making CPOE	Self-confidence (Level 1) Information seeking (Level 1)	Activity exercises Class discussion and participation
4. Develop, deploy, assess, and revise original information retrieval strategies	Online Medical Resources: Medical Information Retrieval; Evidence Based Medicine & Clinical Practice Guidelines	Self-confidence (Level 1) Information Seeking (Level 2)	Homework exercises
5. Ability to evaluate practices to maintain confidentiality and security of health information	Health Information Privacy, Security, and Ethics Workflow Issues	Communication skills (Level 1) Analytical thinking (Level 3) Information seeking (Level 1) Strategic orientation (Level 1) Impact and influence (Level 2)	Reading Quizzes Case analysis Class discussion and participation
6. Improved presentation skills	All course areas	Communication skills (Level 1) Analytical Thinking (Level 2) Information Seeking (Level 1)	Reading Leadership Electronic poster presentation Case presentation Top Ten presentation
*Follow the links to view the definitions of the modified National Center for Healthcare Leadership (NCHL) competencies and the descriptions of the relevant levels. http://hmi.missouri.edu/prospective/Missouri_Modified_NCHL_Competency_Model.pdf			

Summary of Course Assignments and Evaluation of Performance

Total points for the semester: 600

Week	Assignment Description	Due Date	Points
2	Pre Self-assessment	August 30	50
16	Post Self-assessment	December 4	50
4	Reading Leadership	starts September 11, throughout semester	100
6	Crisco Case Study	September 25	50
15	Electronic Poster Presentation	November 29, December 4	100
16	Top Ten List Presentation	December 6	100
all	activity exercises, case analyses, in class discussion, online discussion, participation, and attendance	Every class meeting	150

Statement regarding submission of late assignments and penalties assessed

Students are expected to build in a buffer for possible normal delays (Internet connection down, personal illness, etc.). Do not let things go to the last minute. Contact the instructor if you run into extenuating circumstances (death in the family, etc.). Instructor reserves the right to reduce an assignment 10% of its normal value for each day or part of day late.

All course components must be completed to pass the course. Skipping an assignment will result in the student failing the course regardless of the resulting course average.

Assignment Due Dates The instructors reserve the right to adjust the dates to match the progression of the course.

*Group chapter presentations and activities and reading leadership will be ongoing throughout the semester. Please be familiar with your assigned due dates.

Self-assessments: Self-assessment are provided at the beginning of the course and after material has been covered.

Case studies: Student evaluation of an informatics scenario. The evaluation is provided in writing or as a PowerPoint presentation depending on the assignment. Grading is based on how well insights learned in the course are applied to the case.

Presentations: There are large group, small group, and individual presentation opportunities: activities, Crisco General Hospital, electronic posters, reading leadership. Grade based on quality of content (depth of investigation, originality of analysis and evaluation) and on group and individual effectiveness in delivering the content orally and electronically.

Reading Leadership: Individual student presentation of an assigned reading. The reading leader will provide a written summary of approximately 150 - 200 words and one or two questions to start the discussion of the article. The reading leader will post to the discussion forum the written summary and questions no later than 12 noon the day of class that the article is to be discussed. An insightful summary and questions are expected.

Participation: In-class questions, comments, and responses to activity exercises, case analysis, and reading leadership. Discussion is an integral part of the learning process in this class. It stimulates critical thinking and creativity. Everyone's opinion is welcome. If you have a question probably someone else is wondering about that issue too. In this class the instructors expect everyone to participate. There are numerous opportunities for students to ask questions and comment on what others have presented or commented. As a supplement, students may also respond in writing to the reading leadership posts. In order to be timely and considered these posts should be made within 24 hours of the class in which the article was discussed. This grade component is scored at the end of the semester by the instructors' recall of how much and what the student said during the semester.

Submission of Student Materials: Unless otherwise noted, assignments should be submitted online in course website.

Cite Work Properly: All sources used in presentations, homework, cases, and assignments must be cited properly using APA format or AMA format.

Attendance: Full participation is expected. Students are expected to attend every class and to notify the instructor by e-mail or phone if unable to attend. Make-up work may be required if you miss a class. Failure to give prior notification regarding an absence, to hand in any required make-up work and or a consistent lack of informed, constructive engagement in classroom activity may result in up to a 15% deduction in total course points.

Course average	Course grade
98.00-100	A+
93.34-97.99	A
90.00-93.33	A-
86.67-89.99	B+
83.34-86.67	B
80.00-83.33	B-
76.67-79.99	C+
73.34-76.67	C
70.00-73.33	C-
Below 70	F

Schedule of Dates, Topics, and Chapter Readings

Week 1

Overview of Course
Foundational Information in Health Informatics
Chapter 1

Week 2
Theoretical Foundations of health Informatics
Chapter 2

Week 3
Evidence Based Practice, Practice-Based Evidence, and Health Informatics
Chapter 3

Week 4
Technical Infrastructure to Support Healthcare
Chapter 5

Electronic Health Records and Applications for Managing Patient Care
Chapter 6

Week 5
Electronic Health Records and Applications for Managing Patient Care
Chapter 6

Administrative Applications Supporting Healthcare Delivery
Chapter 7

Week 6
Telehealth and Applications for Delivering Care at a Distance
Chapter 8

Week 7
Public Health Informatics
Chapter 11

Week 8
Clinical Decision Support
Chapter 10

Week 9
Informatics-Related Standards and Standard-Setting Organizations
Chapter 22

Week 10
Strategic Planning and Selecting an Information System
Chapter 16

Implementing and Upgrading an Information System
Chapter 19

Week 11
Personal Health Records
Chapter 14

mHealth: The Intersection of Mobile technology and Health
Chapter 15

Week 12
Data Science and Analytics in Healthcare
Chapter 23

Week 13
Patient Safety and Quality Initiatives in Health Informatics
Chapter 24

Week 14
Happy Thanksgiving!

Week 15
Privacy and Security
Chapter 26

Week 16
Poster Presentations
Top 10 Presentations

Policies and Expectations

Expectations for Professional Conduct

Laptop/tablet/slate/PDA/cell phone usage: Students will need to bring a computer in order to participate in applied exercises. Use of any electronic devices is permitted by announcement of the instructor for specific class related activities.

Deadlines and due dates: Students are responsible for learning of important deadlines and due dates. These dates will be posted on the course Website or announced in class. Students should check the course Website and attend class to learn of these dates. If you are absent it is your responsibility to learn of anything posted or announced while you were absent.

Anticipate the unanticipated: It is possible you will experience computer problems, illness, family issues, etc. Computers crash. People get sick. Please plan for this possibility by not "waiting until the last minute," by finishing assignments early, etc. Have a plan to access an emergency computer if you have to. Save work to a flash, disk, email, network location, etc. and not just your hard-drive.

Statement on Academic Integrity

Academic integrity is fundamental to the activities and principles of a university. All members of the academic community must be confident that each person's work has been responsibly and honorably acquired, developed, and presented. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. The academic community regards breaches of the academic integrity rules as extremely serious matters. Sanctions for such a breach may include academic sanctions from the instructor, including failing the course for any violation, to disciplinary sanctions ranging from probation to expulsion. When in doubt about plagiarism, paraphrasing, quoting, collaboration, or any other form of cheating, consult the course instructor.

Academic Dishonesty includes, but is not necessarily limited to, the following:

A. Cheating or knowingly assisting another student in committing an act of cheating or other academic dishonesty.
B. Plagiarism, which includes, but is not necessarily limited to, submitting examinations, themes, reports, drawings, laboratory notes, or other material as one's own work when such work has been prepared by another person or copied from another person.
C. Unauthorized possession of examinations or reserve library materials, or laboratory materials or experiments, or any other similar actions.
D. Unauthorized changing of grades or markings on an examination or in an instructor's grade book, or such change of any grade report.

The University has specific academic dishonesty administrative procedures. Although policy states that cases of academic dishonesty must be reported to the Office of the Provost for possible action, the instructor may assign a failing grade for the assignment or a failing grade for the course, or may adjust the grade as deemed appropriate. The instructor also may require the student to repeat the assignment or to perform additional assignments. *Office of the Provost, April 11, 1994*

Students will be expected to abide by the Student Conduct Code as set forth in the HMI Student Handbook and the *Rules and Regulations of the University of Missouri-Columbia*, **M-Book Online.** The policy states, "All forms of dishonesty destroy the trust and integrity on which the academic community of the University is built". Dishonesty includes cheating and plagiarism, defined as:

a. The term **cheating** includes but is not limited to: (i) use of any unauthorized assistance in taking quizzes, tests, or examinations; (ii) dependence upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments; (iii) acquisition or possession without permission of tests or other academic material belonging to a member of the University faculty or staff; or (iv) knowingly providing any unauthorized assistance to another student on quizzes, tests, or examinations.
b. The term **plagiarism** includes, but is not limited to: (i) use by paraphrase or direct quotation of the published or unpublished work of another person without fully and properly crediting the author with footnotes, citations or bibliographical reference; (ii) unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials; or (iii) unacknowledged use of original

work/material that has been produced through collaboration with others without release in writing from collaborators.

c. All forms of academic dishonesty will be reported to the HMI faculty and the Dean of the Graduate School for appropriate university action.

Statement of Nondiscrimination

The University of Missouri does not discriminate on the basis of race, color, religion, national origin, ancestry, sex, age, disability, or status as a disabled veteran, or veteran of the Vietnam era. For more information, please see the University of Missouri official Statement of Nondiscrimination (http://www.missouri.edu/eeo-aa.php).

Statement on Intellectual Pluralism

The University community welcomes intellectual diversity and respects student rights. Students who have questions concerning the quality of instruction in this class may address concerns to either the Departmental Chair or Divisional leader or Director of the Office of Students Rights and Responsibilities (http://osrr.missouri.edu/). All students will have the opportunity to submit an anonymous evaluation of the instructor(s) at the end of the course.

Statement Regarding Recording

Faculty allowing recording

University of Missouri System Executive Order No. 38 lays out principles regarding the sanctity of classroom discussions at the university. The policy is described fully in Section 200.015 of the Collected Rules and Regulations. In this class, students may make audio or video recordings of course activity unless specifically prohibited by the faculty member. However, the redistribution of audio or video recordings of statements or comments from the course to individuals who are not students in the course is prohibited without the express permission of the faculty member and of any students who are recorded. Students found to have violated this policy are subject to discipline in accordance with provisions of Section 200.020 of the Collected Rules and Regulations of the University of Missouri pertaining to student conduct matters.

Faculty not allowing recording

University of Missouri System Executive Order No. 38 lays out principles regarding the sanctity of classroom discussions at the university. The policy is described fully in Section 200.015 of the Collected Rules and Regulations. In this class, students may not make audio or video recordings of course activity, except students permitted to record as an accommodation under Section 240.040 of the Collected Rules. All other students who record and/or distribute audio or video recordings of class activity are subject to discipline in accordance with provisions of Section 200.020 of the Collected Rules and Regulations of the University of Missouri pertaining to student conduct matters.

Those students who are permitted to record are not permitted to redistribute audio or video recordings of statements or comments from the course to individuals who are not students in the course without the express permission of the faculty member and of any students who are

recorded. Students found to have violated this policy are subject to discipline in accordance with provisions of Section 200.020 of the Collected Rules and Regulations of the University of Missouri pertaining to student conduct matters.

ADA Accommodations Statement

Students with disabilities:

Please let me know as soon as possible if:

- You anticipate barriers related to the format or requirements of this course.
- You have emergency medical information to share with me.
- You need to make arrangements in case the building must be evacuated.

If you require disability-related accommodations (such as a notetaker, extended time on exams or captioning), please establish an Accommodation Plan with the Disability Center:

- disabilitycenter.missouri.edu
- S5 Memorial Union
- 573-882-4696

After you have registered, please notify me of your eligibility for reasonable accommodations. For other MU resources for students with disabilities, click on "Disability Resources" on the MU homepage.

This sample statement is posted on the web at
http://disabilityservices.missouri.edu/faculty/syllabus.php.

Decision Support Systems for Health Care
HMI-8571 / Spring 2019

Department of Health Management and Informatics
School of Medicine, University of Missouri

Patricia E. Alafaireet, PhD, MHA
734 Clinical Support and Education Building
Alafaireetp@health.missouri.edu
(573) 882-9904

Course Description

Purpose:
This course is designed to provide an overview of clinical decision support systems (CDSS) and their use in the provision of health care. A problem based approach is used to frame both the theoretical underpinnings of CDSS and their practical application. Students will develop an understanding of the mathematical foundations of CDSS as well as learn to identify clinical processes that might benefit from their use. Course content includes an in-depth overview of the theory and methods associated with development, appropriate selection, implementation, and management of CDSS. The course contains specific content around the ethical use of CDSS and around administrative issues, such a return on investment.

Definition:
Clinical decision support system (CDSS). A tool designed to aid in the clinical decision making process through which characteristics of a particular patient at a particular time are matched with a knowledge base to create a set of diagnosis, recommendations for care or other materials which are then used by clinicians, care providers and/or patients.

Course Credit
Three credit hours

Prerequisites

- HMI 7410 Design of Health and Human Service Systems;
- HMI 7430 Introduction to Health Informatics;

Day, Time, and Location

See Executive Weekend Schedule

Office Hours
Please contact the instructor to schedule an appointment

Required Reading

- Berner, ES. (ed.). Clinical Decision Support Systems: Theory and Practice. Second Edition Springer-Verlag, New York. 2007(ISBN 13-978-4419-2223-6)
- Journal articles, cases, and current news items as listed in the syllabus

Summary of Course Assignments and Their Weightings

Assignment	Available Points	Percent of Course Total
The Good, The Bad, And the Ugly	10	1.4%
Patient Special Needs	25	3.5%
Team Selection	10	1.4%
Concept Generation	25	3.5%
Concept Selection	25	3.5%
Taxonomy Presentation	25	3.5%
Brainstrain	25	3.5%
GEM	25	3.5%
Decision Model	25	3.5%
Software Application Review	25	3.5%
Major Workflow	25	3.5%
CDSS Scavenger Hunt	25	3.5%
Risk Tool	25	3.5%
Use Case	25	3.5%
Pro forma	25	3.5%
Evaluation Strategy	25	3.5%
Case Presentation	200	28%
Attendance (29)	145 (5 each)	20%
Total	715	Approx. !00%

Opportunity for Extra Credit- Addition of *new*
(not on the literature review list at time of your posting) *recent*
(2013 or later) scholarly article (from peer reviewed journal)
 to literature review for course - one (1) point each up to 25

Course Objectives

This course is designed to provide an overview of the theory and methods associated with the construction and management of clinical decision support systems designed for use in the health arena. This course focuses understanding design that is supportive of best practice in clinical care, including patient safety, care quality and efficacy of treatment. Much of the actual work of the course will be problem based and students can expect to participate in numerous applications of the science to the case. Specifically, the course will address the following:

1. Demonstrate basic skills (information evaluation, management, and knowledge representation) needed to translate decision support techniques into provision of effective and efficient patient care.
2. Understand the scientific evidence underpinning clinical decision support, and critique how it is used in specific CDSS tools.
3. Learn to identify the areas in clinical practice which might benefit from use of a decision support system as well as evaluate the challenges surrounding developing and implementing such a system.
4. Define the ethical and legal issues surrounding clinical decision support systems.
5. Develop sufficient knowledge of clinical decision support systems to make an informed and intelligent purchase from a decision support vendor.
6. Delve into emerging trends in CDSS development and use.

SPECIFIC OBJECTIVES

Upon successful completion of this course, you will be able to
- Evaluate all aspects of clinical decision support systems and their effective use
- Understand the components of a CDSS and how they interact
- Understand the vocabularies, dictionaries and other tools needed to effectively maintain CDSS
- Create a basic request for proposal for the purchase of a CDSS
  .

SKILLS COMPETENCIES

Successful completion of this course is dependent on more than regurgitation of materials presented as readings and lectures. Students are expected to take the initiative to utilize coursework to develop skills in the areas of analytic thinking, accountability, communication, and finance. These skills will be learned through a variety of activities including in depth discussion and hands on application of theory to a specific problem. Specific activities are detailed in assignments and will be discussed further in during class.

Evaluation of Performance, Course Assignments, and Due Dates

All assignments are due by midnight of the date detailed in the course schedule. Late assignments (unless prior approval is obtained from the instructor) will result in a one grade level deduction (from the overall earned value/grade) provided the assignment is turned in within 2 days of the due date. If the assignment is not turned in 2 days after the due date an additional grade level will be deducted for each 2 days.

Grading Criteria (Please see Mechanics Specifications and Grading Criteria for Written Work for Details)

Written assignments will be graded, on a five point scale (with 5 being highest and 1 lowest), according to standard criteria, as follows;

- Directly addresses the question posed
- Clearly demonstrates understanding of the reason the end user requires information
- Formatting meets the needs of the end user
- Clearly supports decision making by the end user
- Demonstrates understanding of the health care environment
- Presents clear, concise and compelling conclusions)
- Assignment incorporates support by highest quality evidence
- "Referred to" materials are relevant to end user decision making
- Data presented is credible and verifiable
- Includes quantification when it increases end user understanding
- Examples, scenarios and case outlines are pertinent to the decision making process
- Utilizes effective data analysis tools, such as SWOT
- Presents data is graphic form when applicable
- Graphics support, in form and content, proposed arguments
- Graphics replace and augment text effectively
- Includes evidence of self-directed learning
- Includes evidence of innovative thinking
- Is free of error in spelling and grammar
- Is free of misuse of common forms of words, such as "your" instead of "you're"
- Is free of supplemental words which do not add meaning
- Language employed is precise and transparent
- Acronyms and abbreviations are adequately defined
- Is free of disparaging material
- Is free of plagiarism and other forms of dishonesty
- Credits person(s) other than the author(s) who have contributed to the assignment
- Provides avenue(s) for further investigation by the end user
- Shows a continued pattern of improvement in skills
-

General Format For Written Assignments and Final Paper (See Mechanic Specifications for more details)

Format		
	Font	
		Body-Arial(12pt)
		References-Arial (8pt)
	Margins	
		1" margin on all sides
	Spacing	
		Body-Double spaced
		References-single spaced. two columns
	Identification	
		Name of project justified left in header on all pages
		Date and page number centered in footer
		Contributors to each paragraph listed by initials on first appendix
	Numbering	
		Sections numbered in sequential order
		Paragraphs identified by section number and alpha character
	Tables and graphs	
		Appropriately identified and graph or figure in text by sequential numbering
		Located in appendices

Grade Assignment Ranges (in percentage of total available points)

97-100% = A+	77-79.9%= C+
94-96.9%=A	74-76.9%=C
90-93.9%=A-	70-73.9%=C-
87-89.9% =B+	0-70%=F
84-86.9% =B	
80-83.9%=B-	

Final Presentation
A presentation regarding your CDSS solution

Schedule of Topics, Readings and Assignments

Week 1
Topic- Introduction to Clinical Decision Support

Topic- Case Introduction

Topic- Special Needs

Readings- As Assigned

Topic- Introduction to Patients

Assignment- Patient Special Needs

Assignment- The Good, The Bad, And the Ugly

Week 2
Topic-CDS User Perspectives

Topic- Historical Review of CDSS

Topic-Reasoning Types

Textbook Chapters 1,2, and 10

Readings- As Assigned

Week 3
Topic- Concept creation and selection

Readings- As assigned

Week 4
Topic-Taxonomy

Topic-Evidence Bases

Textbook- Chapters 3 and 4

Readings- As Assigned

Assignment- Taxonomy Presentation

Assignment- Brainstrain

Week 5
Topic- Guidelines

Readings- as assigned

Assignment-GEM

Week 6
Topic- Preparation for Decision Modeling

Textbook Chapters 5 and 6

Readings- As Assigned

Reading-Article- Unexpected Increased Mortality After Implementation of a Commercially Sold Computerized Physician Order Entry System. Available at http://www.pediatricsdigest.mobi/content/116/6/1506.full

Assignment- Decision Modeling

Week 7
Topic- Legal and Ethical Issues in the Development and Use of CDSS

Topic- Software Review

Readings- As Assigned

Reading-Article- Unexpected Increased Mortality After Implementation of a Commercially Sold Computerized Physician Order Entry System. Available at http://www.pediatricsdigest.mobi/content/116/6/1506.full

Assignment- Software Application Review

Week 8
Topic-Preparation for Workflow Modeling

Textbook Chapters 7, 9, and 11

Readings- As Assigned

Assignment- Workflow

Week 9

Topic- Technical Requirements

Readings- as assigned

Week 10
Topic- Standards

Readings- As Assigned

Assignment-Clinical Decision Support Systems Scavenger Hunt

Week 11
SPRING BREAK

Week 12
Topic- Risk and Risk Analysis in CDSS

Readings- As Assigned

Assignment- Risk Tool

Week 13
Topic- Requirements gathering

Readings- As Assigned

Assignment- Use Case

Week 14
Topic-Pro Forma

Topic- Funding for CDSS

Topic-ROI

Topic-Ownership Costs

Readings- As Assigned

Assignment- Pro forma

Week 15
Topic-CDSS Evaluation

Readings- As Assigned

Week 16
Case Presentations

Course Objectives

Matrix of Course Objectives, Knowledge Areas, Competencies, Assignments, and Evaluation			
Course Objectives	Course Knowledge Areas	NCHL Competencies and Levels	Assignments and Evaluation
1. Develop basic skills (information evaluation, management, and knowledge representation) to translate decision support techniques to the benefit of patient care.	Introduction to basic concepts of decision support systems and their applications in health care	Strategic Orientation, Level 2 Financial skills and management Orientation, Level 4 Health Care Administration, Level 3 Health informatics Information Technology Management, Level 3	Selection of identified CDSS., Final poster
2. Understand the impact of scientific evidence, and its acceptance and use in clinical medical practice.	Introduction to extensive literature base as well as industry and vendor processes	Innovative se eking, Level 4 Health informatics	Weekly Assignments Final Poster
3. Identify the areas which might benefit from a decision support system and evaluate the challenges surrounding developing and		Innovative Thinking, Level 4 Health informatics Organizational Decision Making, Analytical Thinking, Level 3	Discussion Forum and Classroom Discussion Selection of identified CDSS. WEEKLY ASSIGNMENTS, Final Poster

implementing such a system.			
4. Discuss the ethical and legal issues surrounding clinical decision support systems.	In depth understanding of the ethical and legal considerations and consequences of the use and non-use of CDSS	Communication Skills, Level 3; Achievement Orientation, Level 5 Information technology management Level 3; Acting with Integrity/Ethical Decision Making	Discussion Forum and Classroom Discussion Selection of identified CDSS. WEEKLY ASSIGNMENTS, Final Poster
5. Develop sufficient knowledge of clinical decision support systems to make an informed and intelligent purchase from a decision support vendor.	Mastery of a specific CDSS need in a clinical environment and extensive knowledge of user needs requirements, clinical decision making processes and financial and quality ramifications of CDSS use	Interpersonal Skills, Relationship Building, Level 3 Analytical Thinking. Level 3 Initiative, Level 4	Discussion Forum and Classroom Discussion Selection of identified CDSS. WEEKLY ASSIGNMENTS, Final Poster
6. Delve into emerging trends in CDSS development and use.	Extensive knowledge of emerging financial and reimbursement models, care delivery models and other timely issues related to the development and use in clinical practice of CDSS	Politics of health policy, Information Seeking, Level 4 **Achievement orientation Level 5**	Discussion Forum and Classroom Discussion Selection of identified CDSS. WEEKLY ASSIGNMENTS, Final Poster
*See definitions of the National Center for Healthcare Leadership competencies and descriptions of levels below.			

Definition of NCHL Competencies and Description of Levels to Be Achieved
1. **Achievement orientation**—A concern for surpassing a standard of excellence. **Level 5**: Benefit-Cost Analyses—makes decisions, sets priorities, or chooses goals on the basis of calculated inputs and outputs
2. **Analytical Thinking** Level 3: Recognizes Multiple Relationships
3. **Communication skills**—The ability to speak and write in a clear, logical, and grammatical manner in formal and informal situations and to prepare cogent business presentations. **Level 3**: Makes Persuasive Oral Presentations using generally accepted English grammar and prepares effective written business cases or presentations.
4. **Financial Skills-** Level 4: Evaluates Financial Analyses and Investments
5. **Information seeking**—An underlying curiosity and desire to know more about things, people, or issues, including the desire for knowledge and staying current with health, organizational, industry, and professional trends and developments. **Level 4:** Conducts Research to Maintain Knowledge—makes a systematic effort over a limited period of time to obtain needed data or feedback and conducts in-depth investigation from unusual sources
6. **Information Technology Management** Level 3: Champions Decision Support Systems Implementation
7. **Initiative** Level 4: Takes Action on Longer-Term Opportunities
8. **Innovative thinking**—The ability to apply complex concepts, develop creative solutions, or adapt previous solutions in new ways for breakthrough thinking in the field. **Level 4**: Clarifies Complex Ideas or Situations—re-framing the problem, using analogy, boiling down information.
9. **Relationship Building** Level 3: Sustains Formal Contacts
10. **Strategic orientation**—The ability to consider the business, demographic, ethno-cultural, political, and regulatory implications of decisions and develop strategies that continually improve the long-term success and viability of the organization. **Level 2**: Develop Strategy to Address Environmental Forces—three to five year period

Policies and Expectations

Expectations for Professional Conduct

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- **Behavior:** Classroom interaction will be conducted in a spirited manner, but always while displaying professional courtesy and personal respect.

- **Preparation:** Students are expected to complete the readings, case preparations and other assignments **prior** to each class session and be prepared to actively participate in class discussion.
- **Distractions**:
  - o Exiting and Entering: Students are expected to remain in the classroom for the duration of the class session unless an urgent need arises or prior arrangements have been made with the professor.
  - o Laptop or PDA Usage*:* Students are expected to use laptops or PDAs only with the instructors consent and for activities directly related to the class session. Unapproved accessing of e-mail or the Internet during class is not permitted.
  - o Cell Phone Usage*:* Students are expected to keep their cell phones and pagers turned off or have them set on silent/vibrate during class. Answering phones or pagers, or **sending or receiving text messages while class is in session is not permitted.**

Late assignments. Unexcused late papers will be accepted but will be assessed a late paper deduction as described above.

Statement on Academic Integrity

Academic integrity is fundamental to the activities and principles of a university. All members of the academic community must be confident that each person's work has been responsibly and honorably acquired, developed, and presented. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. The academic community regards breaches of the academic integrity rules as extremely serious matters. Sanctions for such a breach may include academic sanctions from the instructor, including failing the course for any violation, to disciplinary sanctions ranging from probation to expulsion. When in doubt about plagiarism, paraphrasing, quoting, collaboration, or any other form of cheating, consult the course instructor.

Academic Dishonesty includes, but is not necessarily limited to, the following:
   A. Cheating or knowingly assisting another student in committing an act of cheating or other academic dishonesty.
   B. Plagiarism, which includes, but is not necessarily limited to, submitting examinations, themes, reports, drawings, laboratory notes, or other material as one's own work when such work has been prepared by another person or copied from another person.
   C. Unauthorized possession of examinations or reserve library materials, or laboratory materials or experiments, or any other similar actions.
   D. Unauthorized changing of grades or markings on an examination or in an instructor's grade book, or such change of any grade report.

The University has specific academic dishonesty administrative procedures. Although policy states that cases of academic dishonesty must be reported to the Office of the Provost for possible action, the instructor may assign a failing grade for the assignment or a failing grade for the course, or may adjust the grade as deemed appropriate. The instructor also may require the student to repeat the assignment or to perform additional assignments. *Office of the Provost, April 11, 1994*

Students will be expected to abide by the Student Conduct Code as set forth in the HMI Student Handbook and the *Rules and Regulations of the University of Missouri-Columbia*, (**M-Book Online**: **http://web.missouri.edu/~umcstudentlifeweb/docs/M-Book2007-2008.pdf.** The policy states, "All forms of dishonesty destroy the trust and integrity on which the academic community of the University is built". Dishonesty includes cheating and plagiarism, defined as:

   a. The term **cheating** includes but is not limited to: (i) use of any unauthorized assistance in taking quizzes, tests, or examinations; (ii) dependence upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments; (iii) acquisition or possession without permission of tests or other academic material belonging to a member of the University faculty or staff; or (iv) knowingly providing any unauthorized assistance to another student on quizzes, tests, or examinations.
   b. The term **plagiarism** includes, but is not limited to: (i) use by paraphrase or direct quotation of the published or unpublished work of another person without fully and properly crediting the author with footnotes, citations or bibliographical reference; (ii) unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials; or (iii) unacknowledged use of original work/material that has been produced through collaboration with others without release in writing from collaborators.
   c. All forms of academic dishonesty will be reported to the HMI faculty and the Dean of the Graduate School for appropriate university action.

Statement of Nondiscrimination
The University of Missouri does not discriminate on the basis of race, color, religion, national origin, ancestry, sex, age, disability, or status as a disabled veteran, or veteran of the Vietnam era. For more information, please see the University of Missouri official Statement of Nondiscrimination (http://www.missouri.edu/eeo-aa.php).

Statement on Intellectual Pluralism

The University community welcomes intellectual diversity and respects student rights. Students who have questions concerning the quality of instruction in this class may address concerns to either the Departmental Chair or Divisional leader or Director of the Office of Students Rights and Responsibilities (http://osrr.missouri.edu/). All students will have the opportunity to submit an anonymous evaluation of the instructor(s) at the end of the course.

Statement regarding recording

University of Missouri System Executive Order No. 38 lays out principles regarding the sanctity of classroom discussions at the university. The policy is described fully in Section 200.015 of the Collected Rules and Regulations. In this class, students may not make audio or video recordings of course activity, except students permitted to record as an accommodation under Section 240.040 of the Collected Rules. All other students who record and/or distribute audio or video recordings of class activity are subject to discipline in accordance with provisions of Section 200.020 of the Collected Rules and Regulations of the University of Missouri pertaining to student conduct matters.

Those students who are permitted to record are not permitted to redistribute audio or video recordings of statements or comments from the course to individuals who are not students in the course without the express permission of the faculty member and of any students who are recorded. Students found to have violated this policy are subject to discipline in accordance with provisions of Section 200.020 of the Collected Rules and Regulations of the University of Missouri pertaining to student conduct matters.

ADA Accommodations Statement

Students with Disabilities:

If you anticipate barriers related to the format or requirements of this course, if you have emergency medical information to share with me, or if you need to make arrangements in case the building must be evacuated, please let me know as soon as possible.

If disability related accommodations are necessary (for example, a note taker, extended time on exams, captioning), please register with the Office of Disability Services (http://disabilityservices.missouri.edu), S5 Memorial Union, 573- 882-4696, and then notify me of your eligibility for reasonable accommodations. For other MU resources for students with disabilities, click on "Disability Resources" on the MU homepage.

HMI 8573 Syllabus

Decision Making for Health Care Organizations – Spring 2019

Department of Health Management and Informatics

School of Medicine, University of Missouri

Koby L. Clements, MBA

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CE549 CS&E Building

(573) 884-5738

K. Morgan Davis, MHA

daviskm@health.missouri.edu

CE547 CS&E Building

(573) 882-7423

Course Overview

Course Description

This course provides an integrated approach to achieving operational improvements within health care systems, and for applying concepts, techniques, and tools to solve problems, leading to effective decision making in complex health care organizations and systems. The course enables the student to develop skills in defining strategic and operational management problems, understanding the complex nature of management decisions, and utilizing various software for analysis purposes, with specific emphasis on process analysis and improvement applications. Perspectives on data and decisions in healthcare organizations will be also provided.

Special Feature:

Students completing this course will be eligible to sit for the Institute of Industrial and Systems Engineers' (http://www.iienet2.org/Default.aspx) Lean Six Sigma Green Belt Certification Exam.

Course Credit

Three credit hours

Prerequisites

- HMI 7410
- Graduate standing or permission of the instructor

Day, Time, and Location

Tuesday and Thursday, 3:15 – 4:30, CE705, CS&E Building

Office Hours

Open Hours – Contact the instructors via email with questions and/or to set up a phone conversation if desired.

Required Readings, Videos, & Programs

- Texts
    - Brassard M. & Ritter, D. (2008). *The Memory Jogger II (Healthcare Edition).* Salem NH: GOAL/QPC.
    - Wheeler DJ (2000). *Understanding Variation – The Key to Managing Chaos*. SPPC Press
    - George, Rowlands, Price and Maxey. *The Lean Six Sigma Pocket Textbook*. McGraw-Hill
- Assigned readings and additional items sent via email during course
- Assigned videos as identified on Moodle
- All Microsoft Excel Assignments are written for **Microsoft Office 2013 and 2016 for Windows**. While all exercises can be completed with Microsoft Office 2010 or Excel for Mac, Office 2013 or 2016 is highly recommended. If students do not have Office 2013 or 2016 on their personal computer, they are offered to students throughout the campus computer labs and from home through Software Anywhere http://doit.missouri.edu/services/software/software-anywhere.html.

Optional Materials

- **Free On-line Resource within MU Health Sciences Library:** Ogrinc, Headrick, et. al. (2012) Fundamentals of Health Care Improvement – A Guide to Improving Your Patients' Care – 2nd ed.
  https://library.missouri.edu/secure/resources/healthsciences/978-1-59940-569-8.pdf
- Any additional recommended or supplemental materials (see Moodle course website)
- List of useful websites for reference purposes, if applicable (see Moodle course website)

Course Competencies

The HMI Department is using a modified version of the National Center for Healthcare Leadership (NCHL) competencies model (http://hmi.missouri.edu/prospective/Missouri_Modified_NCHL_Competency_Model.pdf). In this course three areas of the NCHL competencies are addressed.

Analytical Thinking	The ability to **understand a situation, issue, or problem by breaking it into smaller pieces or tracing its implications in a step-by-step way.** It includes organizing the parts of a situation, issue, or problem systematically; making systematic comparisons of different features or aspects; setting priorities on a rational basis; and identifying time sequences, causal relationships, or if-then relationships.
Level 1:	Breaks Down Problems *(breaks problems into simple lists of tasks or activities without assigning values; lists items with no particular order or set of priorities)*
Level 2:	Identifies Basic Relationships (*identifies the cause-and-effect relationship between two aspects of a situation; separates situations into two parts—pro and con; sorts out a list of tasks in order of importance*)
Change Leadership	The ability to **energize stakeholders and sustain their commitment to changes in approaches, processes, and strategies**.
Level 1:	Identifies Areas for Change (publicly defines one or more specific areas where change is needed; identifies what needs to change, but may not completely describe the path to change)
Level 2:	Expresses Vision for Change (defines an explicit vision for change—i.e., what should be different and how; modifies or redefines a previous vision in specific terms; outlines strategies for change)
Information Seeking	An underlying curiosity and desire to know more about things, people, or issues, including the desire for knowledge and staying current with health, organizational, industry, and professional trends and developments. It includes **pressing for exact information; resolving discrepancies by asking a series of questions; and scanning for potential opportunities** or information that may be of future use, as well as staying current and seeking best practices for adoption.
Level 1:	Consults Available Resources (asks direct questions of the people who are knowledgeable about the situation, such as people who are directly involved; uses readily available information, or consults other resources)
Level 2:	Investigates Beyond Routine Questions (conducts preliminary investigations regarding a problem or situation beyond routine questioning; finds those closest to the problem and investigates further, such as asking)
Level 3:	Delves Deeper (asks a series of probing questions to get at the root of a situation, a problem, or a potential opportunity below the surface issues presented; calls on others who are not personally involved, to get their perspective, background information, experience, etc.; does not stop with the first answer, finds out why something happened; seeks comprehensive information, including expecting complexity)

Matrix of Course Objectives, Knowledge Areas, Competencies, Assignments, and Evaluation			
Course Objectives	Course Knowledge Areas	NCHL Competencies and Levels*	Course Assignments and Evaluation
Understand roles and tools in healthcare evaluations with particular emphasis on process analysis and improvement.	Evaluation designs and applications Evaluation methods, measures and analysis with applications	Analytic Thinking: Levels 1,2,3 Information Seeking: Levels 1,2,3 Change Leadership: Levels 1,2	Individual Exercises; Improvement Tool Portfolio, Quizzes, Exams
Students will acquire knowledge, understand, define, describe, recognize, analyze, and interpret information related to: a) use of organizational measurement tools; b) identifying and interpreting process variation; c) QI/PI process analysis and improvement tools; and d) change management tools. e) PDSA model of improvement; f) process analysis and process design tools; g) roles and relationships	KPI/KPO, leading and lagging indicators, and key process indicators; and, use of Excel to analyze and display data, PDSA improvement models; Process analysis and improvement tools, such as: Brain Storming, Affinity Diagram, Inter-relationship Diagram, Flow Chart, Value Stream Analysis, Spaghetti Diagrams, Stake holder Analysis, Capacity Analysis, Run & Control Charts, and additional Lean and Six Sigma Tools and Concepts.	Analytic Thinking: Levels 1,2,3 Information Seeking: Levels 1,2,4 Information Seeking: Levels 1,2,3 Change Leadership: Levels 1,2	Class attendance and participation; Individual Exercises; Improvement Tool Portfolio, Quizzes, Exams, Homework Assignments

Follow the link in Moodle to view the definitions of the National Center for Healthcare Leadership (NCHL) competencies and the descriptions of the relevant levels.

Course Expectations

By the end of the course, there is an expectation that students will have achieved a certain level of expertise and level of competency, and will have demonstrated an ability to apply concepts, techniques, and tools to solving problems that leads to effective decision making in complex health care organization and systems. You will be evaluated based on completion of a combination of homework assignments, quizzes, and exams.

To ascertain the achievement of the purpose and objectives of the course, class attendance and participation, completion of assignments, quizzes and exams, and applications of tools are required. Through these requirements, *individual* competency in achieving the course objectives must be demonstrated. The assignments and due dates are provided below.

Course Grading

The course will be graded on a standard plus / minus scale. Final course grades will be evaluated and curved, if necessary, relative to the overall class performance.

Policies and Expectations

Expectations for Professional Conduct

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- **Preparation:** Students are expected to complete assigned readings, view assigned videos, other assignments prior to each class session, and be prepared to participate actively in class discussion.
- **Distractions**:
  - <u>**Exiting and Entering**</u>: Students are expected to remain in the classroom for the duration of the class session, unless an urgent need arises or prior arrangements have been made with the instructor.
  - ***<u>Laptop or PDA Usage: Students are expected to turn off laptops, PDAs and other electronic recording devices unless otherwise indicated by the instructor.</u>***
  - ***<u>Cell Phone Usage: Students are expected to keep their cell phones and pagers turned off or have them set on silent/vibrate during class, unless otherwise indicated by the instructor.</u>***
- **Completion of all course requirements**. Homework assignments must be turned in by the due date. Late submissions will be penalized.   Missed quizzes cannot be made up.   Exam dates will be announced, and cannot be made up if a student misses the submission deadline. Illness or other significant personal issues mat at the instructors' discretion be used as reasons to make up missed quizzes or exams. Homework assignments will be penalized 50% if submitted the day after due date and be deducted an additional 10% per day (i.e., 60% if two days late, 70% if three days late, etc.).

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other academic material belonging to a member of the University faculty or staff; or (iv) knowingly providing any unauthorized assistance to another student on quizzes, tests, or examinations.

b. The term **plagiarism** includes, but is not limited to: (i) use by paraphrase or direct quotation of the published or unpublished work of another person without fully and properly crediting the author with footnotes, citations, or bibliographical reference; (ii) unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials; or (iii) unacknowledged use of original work/material that has been produced through collaboration with others without release in writing from collaborators.

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Intellectual Property Notice

All course materials including but not limited to the syllabus, course assignments, study guides, learning guides, online lecture videos and content, and lab book (i.e. course pack) are property of the instructor and University and may not be shared online or distributed in any manner to others. Students are prohibited from posting course materials or notes online and from selling notes to or being paid for taking notes by any person or commercial firm without the express written permission of the professor teaching this course. Doing so will constitute both an academic integrity violation and a copyright violation. Violations of copyright laws could subject you to civil penalties and criminal liability. Violations of academic integrity may subject you to disciplinary action under University policies.

Course Deliverables

Item	% of Overall Grade	Due Date(s)	Description
Quizzes	20%	Periodically throughout the semester by the end of each Sunday of the Course	Several quizzes will be given throughout the course. Quizzes may cover course readings and/or videos assigned to be read/viewed on the week associated with that material, as well as material covered in previous sessions. Quizzes will open on Monday of each designated week and close at the end of the week at 11:55 pm on Sunday.
Excel Assignments	30%	#1 – February 12 #2 – February 26 #3 – March 19 #4 – March 26 #5 – April 16 #6 – May 7	To develop key skills in using Microsoft Excel for improvement analyses, students are required to independently complete several exercises. In addition, for selected QI tools included in the QI/PI Tool Portfolio assignment (discussed below), students will be required to create QI tool exhibits within the Excel Assignments. All data tables or figures required to be created must be labeled and presented in a professional manner. The exercises are developed around mock healthcare data to give the students a sense of the type of data they will encounter in their professional lives. In addition to the technical aspects, there will also be an analysis component which will require the students to think critically about the data displays created and effectively communicate key findings through a written analysis.
Final Exam	20%	If taking the LSS exam, as scheduled by student. First attempt to be completed by April 30. The second attempt by May 10. If you elect not to take LSS Exam, notify the Instructor	Exams will be on-line and open book/open note. Students may use course lecture notes, any course assignments and readings to answer the questions. The purpose of the Final Exam is to provide students with an opportunity to rapidly apply information, knowledge and skills developed in the course. The Final Exam time limit is 3 hours. There are two options for the Final Exam: The IISE LSS Certification Exam (must get 70% to pass) or optional exam developed by the instructor. Students will have two opportunities to pass the certification exam, but only one opportunity at the instructor developed exam. To sign up for the Green Belt Exam, complete the Sign-up Sheet for Green Belt Exam questionnaire by February 12.
Final Quiz	15%	May 10	All material covered throughout the course may be included in this quiz. The quiz will be timed and will be accessible at any time between May 6 and May 10.
QI Tools and Concepts Portfolio	10%	Initial – March 5 Revisions – March 26 Quiz – April 9	The QI Tools and Concepts Portfolio will serve to summarize key information for ~60 tools and concepts that can be used to analyze and improve work processes and outcomes. Students will be responsible for writing summaries of two QI tools/concepts over the course of the semester. The result will be a compiled glossary of all students work. The QI Tool Portfolio serves three primary purposes: 1) To increase your understanding of the tools and issues associated with their use; 2) A resource to help prepare for the final exam…questions drawing from the content contained in the columns will be included; and, 3) Serve as a handy resource for your future use in your final EMS project and/or as you roll out improvement initiatives in your organization.
Pre/Post Excel / Access / QI Skills Assessment	5%	Pre – January 22 Post – May 10	The purpose of this self-assessment is two-fold: 1) To help modify the Excel, Access, and QI training content to better fit students' needs; and 2) To provide a measure of students' perception of changes in their ability to use the two software products in analyzing data, and apply QI tools.

Course Schedule

Week	Dates	Topics / Assignments
Week 1	January 16 – 22	Introduction to the Course, Introduction to Lean and Six Sigma, Quality Improvement, PDSA, Model for Improvement, DMAIC *Pre Excel/Access/QI Assessment: Due 1/22*
Week 2	January 23 – 29	Introduction to Lean and Six Sigma, Quality Improvement, PDSA, Model for Improvement, DMAIC (continued), Excel Overview
Week 3	January 30 – February 5	Voice of the Customer, Voice of the Process, Critical to Quality, Kano Analysis, Quality vs. Cost, Value, Waste *Quiz #1: Due 2/5*
Week 4	February 6 – 12	SIPOC, Transfer Function, Rolled Yield Throughput, Aim Statements, Primary and Secondary Data, Check/Tally Data Sheets *Excel Assignment #1: Due 2/12* *Sign-up Sheet for Green Belt Exam: Due 2/12*
Week 5	February 13 – 19	Measurement System Analysis (MSA), Reliability, Repeatability, and Validity, KPIs, Driver Diagrams, Process and Outcome Measures *Quiz #2: Due 2/19*
Week 6	February 20 – 26	Basic Statistics and an Introduction to Variation, Histograms, Run Charts, and Box Plots *Excel Assignment #2: Due 2/26*
Week 7	February 27 – March 5	Probability and Process Capability *QI Tools and Concepts Portfolio: Due 3/5*
Week 8	March 6 – 12	Design of Experiments (DOE) and Hypothesis Testing *Quiz #3: Due 3/12*
Week 9	March 13 – 19	Control Charts, Distributions, and Interpretations *Excel Assignment #3: Due 3/19*
Week 10	March 20 – 26	Flowcharts, Spaghetti Diagrams, VSM, 5S, Human Factors *Excel Assignment #4: Due 3/26* *QI Tools and Concepts Portfolio Revisions: Due 3/26*
Week 11	March 27 – April 2	**Spring Break**
Week 12	April 3 – 9	Flow, Kanban, WIP, Takt Time, Cycle Time, Lead Time, SMED, Poke Yoke *QI Tools and Concepts Portfolio Quiz: Due 4/9*
Week 13	April 10 – 16	Brainstorming and Affinity, Effort/Impact (PICK) Matrix, Root Cause Analysis, Cause and Effect, FMEA, Pareto Charts, Cause Mapping *Excel Assignment #5: Due 4/16* *Quiz #4: Due 4/16*
Week 14	April 17 – 23	Microsoft Access
Week 15	April 24 – 30	Change Management and Stakeholder Analysis *Final Exam (Attempt #1): Due 4/30*
Week 16	May 1 – 7	Spreading and Sustaining Improvement *Excel/Access Assignment #6: Due 5/7*
Week 17	May 8 – 14	*Final Exam (Attempt #2 – LSS Only): Due 5/10* *Final Quiz: Due 5/10* *Post Excel/Access/QI Assessment: Due 5/10*

INTEGRATING ANALYTICS AND LEAN SIX SIGMA CERTIFICATION WITHIN A HEALTHCARE IMPROVEMENT COURSE

Koby L. Clements, MBA, Douglas S. Wakefield, PhD, Sue Boren, PhD, MHA, University of Missouri Health Management and Informatics

DESCRIPTION OF TEACHING STRATEGY

Healthcare managers and leaders are increasingly required to play integral roles in both quality and process improvement (QI/PI) due to changes in how healthcare organizations are paid. To prepare our MHA students to assume key QI/PI roles, we replaced an existing decision making course with a course designed to integrate three primary learning outcomes:

1. use of core improvement methods and tools;
2. use of Microsoft Excel and Access in data analysis and management in QI/PI applications; and,
3. learner Lean Six Sigma Green Belt (LSSGB) certification by an independent organization.

Integration was achieved by developing six data management/analysis assignments requiring use of specific Excel and/or Access techniques to analyze data for QI/PI case scenarios.

IMPLEMENTATION

The course was moved to occur immediately before students entered a summer administrative internship program between the first and second year of study. The first five data analysis assignments were interspersed between the QI/PI content and provided a progression of step-by-step case scenarios to develop specific Microsoft Excel skills. Scenarios were based on feedback from administrative internship and fellowship preceptors and improvement work conducted by faculty within an academic health system. Permission for students to take the LSSGB certification exam from the Institute for Industrial and Systems Engineering (IISE) was granted following review and adjustment of course content. QI/PI tools such as flowcharts, value-stream maps, histograms, run charts, scatter plots, Pareto charts, statistical process control (SPC) charts, KPIs, and surveys where embedded into the assignments via requirements to construct and/or analyze the tools. In addition to completing the Excel assignment and development/analysis of QI tools, each student was required to answer a series of questions to promote critical thinking analysis around the data displays. The sixth assignment consisted of two components: 1) a step-by-step guide on using the various features of Microsoft Access and 2) a charge to create a Clinic Performance Dashboard in Excel utilizing the skills learned in the prior five assignments. The students were then tasked with utilizing the dashboard (Figure 1) that they created to analyze clinic performance across four clinics.

OUTCOMES

38 full-time graduate students were enrolled in the course and participated in a pre-post course self-assessment of 60 Excel skills across ten categories, 42 Access skills across six categories, and about 72 QI methods and tools. Students were asked to assess their confidence (e.g., 5-point, No Confidence to Great Confidence scale) and knowledge (e.g., 5-point, No Knowledge to Great Knowledge scale) with performing these skills. Across all 60 Excel items the percent of students responding "Great Confidence" increased from 23% TO 72% and from 25% to 77% reporting "Great Knowledge" in using Excel. For Access, the percentage responding "Great Confidence" increased from 1% to 36% and "Great Knowledge" from 1% to 40%. Individual skill gains for the three areas can be seen in Figure 2. Across the 72 QI methods and tools, the percent of students responding "Great Confidence" increased from 1% to 42% and "Great Knowledge" from 1% to 57%.
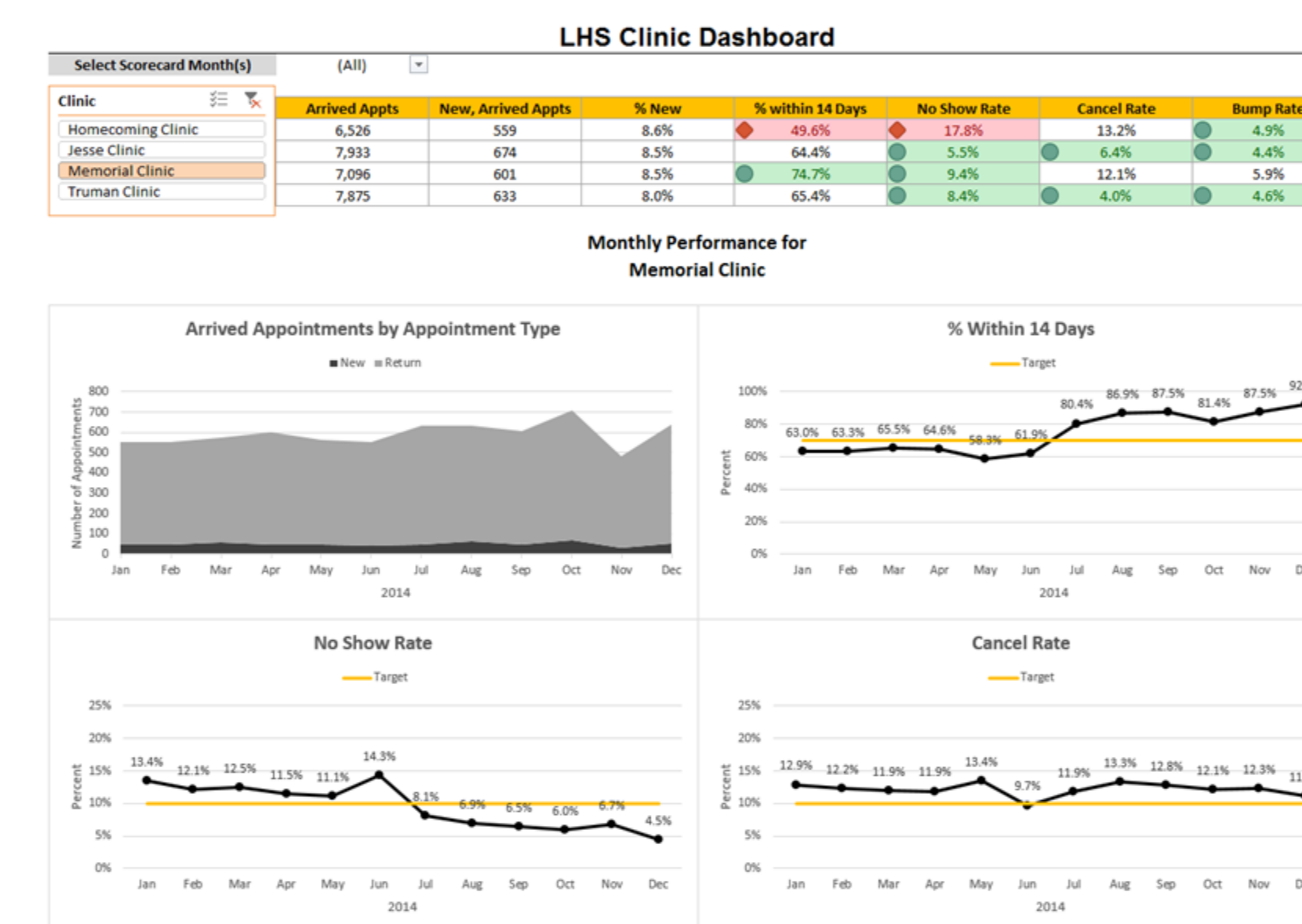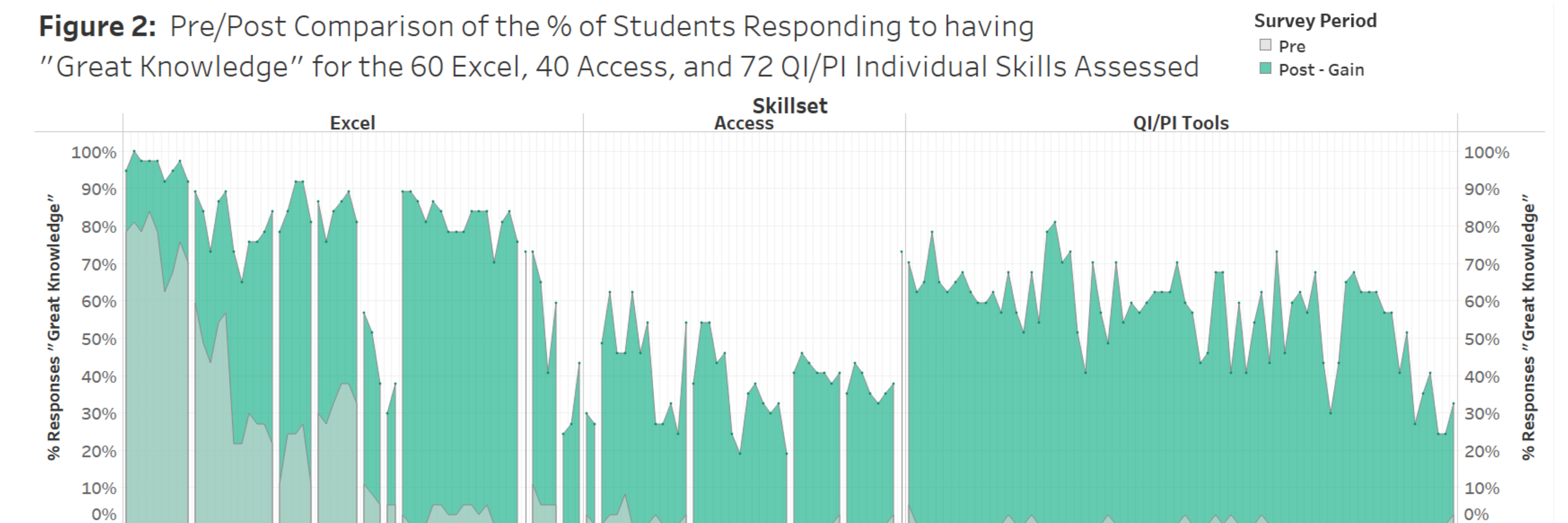

Figure 1: Example Excel Dashboard

Figure 2: Pre/Post Comparison of the % of Students Responding to having "Great Knowledge" for the 60 Excel, 40 Access, and 72 QI/PI Individual Skills Assessed

While self-assessments and graded course assignments as part of a course are useful to validate learning progress, independent external assessments and subsequent reports by students about what was learned are valuable additions. By the end of the course all 38 students successfully passed the external IISE exam and received LSSGB certification. Additional follow-up with our students was done following completion of their administrative internships and prior to completing the second year of the MHA program. A total of 22 students participated in the follow-up and reported the following: 86% were required to use Excel in their internship; with 59% reporting they used advanced tools such as Excel PivotTables, which was one of the key skill emphasized in the course which increased from 2% to 82% of students responding as having "Great Knowledge" of the skill. Interestingly, 91% reported they expected to use Excel vs. 64% expecting to use Access, and 82% to use QI skills developed in the course in future employment.

IMPLICATIONS

An integrated approach to teach QI/PI methods and tools with technical data skill training by using case scenarios with "real" data, along with an opportunity to receive external certification has been very well received by students, and the preceptors alike. Since the initial class of 38 students, a second residential course (33 students) and two executive MHA courses (47 students) who likewise upon course completion, obtained LSSGB certification. Students have continued to report positive feedback overall about the skills obtained from the assignments with many citing that it is one of the most valuable components of their graduate education. Preceptors, alumni, and prospective employers have likewise seen the acquisition of QI, analytic skills, and LSSGB certification very favorably.

The Flipped Classroom: Practices and Opportunities

Iris Zachary, PhD, MS, CTR
Sue Boren, PhD, MHA
University of Missouri

Application of the Flipped Classroom

- Inverted delivery of the lecture
- Engaged and interactive learning environment
- Class time spent on applying learned concepts
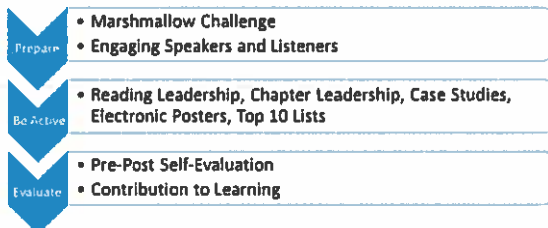- Improved faculty observation of students
- Ongoing and active assessment

FLEXIBLE ENVIRONMENT
LEARNING CULTURE
INTENTIONAL CONTENT
PROFESSIONAL EDUCATOR

Many Topics to Learn

Many Skills to Practice

- Take responsibility for learning
- Think critically and creatively
- Lead and follow on teams
- Communicate effectively
- Make data-driven decisions
- Solve problems
- Identify and evaluate various forms of evidence

Three Steps

Prepare
- Marshmallow Challenge
- Engaging Speakers and Listeners

Be Active
- Reading Leadership, Chapter Leadership, Case Studies, Electronic Posters, Top 10 Lists

Evaluate
- Pre-Post Self-Evaluation
- Contribution to Learning

The Marshmallow Challenge: Process

Marshmallow Challenge
Build the Tallest Freestanding Structure

- Teams of Four People
- Eighteen Minutes
- Using the Following Ingredients

Prepare — Be Active — Evaluate

The Marshmallow Challenge: Outcomes

- Learning is solitary and communal
- New learning is based on prior learning
- Intrinsic motivation: knowledge and skills vs. grades
- Competency: becoming a life-long learner

Prepare | Be Active | Evaluate

Engage as Speakers and Listeners

- Review websites focused on effective presentations
- Reflect on experiences, strengths, improvement areas, audience benefits, resources to share
- Outcome: Increased awareness of behaviors to modify and skills to improve

Prepare | Be Active | Evaluate

Reading Leadership

Individual students present and lead discussion of an assigned article in class and online.

Prepare | Be Active | Evaluate

Chapter Leadership

- Teams of students present select chapters from the text
- Reinforce learning objectives
- Link content to practice

Prepare | Be Active | Evaluate

Electronic Posters

- Tablet computers in healthcare
- Top healthcare IT software vendors
- Mobile phones in healthcare
- Natural language processing
- Usability evaluation
- Cloud computing
- Medical errors and lawsuits
- Biometric identification
- System security
- Barcodes in healthcare
- Medical imaging
- Patient safety
- Social media
- Ethics
- Communication

Prepare | Be Active | Evaluate

Case Studies

- Evaluation of informatics scenarios in teams
- Apply insights learned in the course to the case

Prepare | Be Active | Evaluate

2

Top 10 List

- Teams create a list of their top 10 health informatics topics for the semester
- Link those topics to health care practice
- Top Categories
  - Telehealth/Telemedicine
  - Big Data/Data Analytics
  - Privacy/Security
  - Health Information Exchange
  - Electronic Health Records
  - Meaningful Use
  - Medical Coding/ICD-10
  - Public Health Informatics

Topics
1. Meaningful Use
2. HIPAA/ Privacy Security
3. Telemedicine
4. Information Exchange
5. Consumer Health Informatics
6. Billing/Payment/Cost
7. System Failure, Technical/Human
8. Training Staff, Workforce
9. Big Data Analytics
10. Mobile Technology

Pre-Post Self-Reflection of Learning

- Reflect on knowledge gained
- Knowledge gained moved 2.2 points on a 5.0 point scale from limited knowledge (2.1) to moderate knowledge (4.3)
- Greater awareness by students and instructor of course content requiring additional emphasis
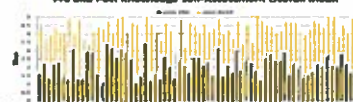
Contribution to Learning

- What did you learn?
- How did you add value to the learning of others?
- How did others add value to your learning?
- What went well?
- What can be improved?

Lessons Learned

1. Each class of students is different
2. Talk about the flipped classroom first (intro to the flipped classroom)
3. Talk about expectations and skills (students are responsible for the co-production of education)
4. Have clear objectives (pre-post self-reflection of learning is tied to this)
5. Find engaging activities that work for the subject
6. Change up the activities

What are the activities and elements of a flipped classroom in your courses?

Please share
zacharyi@health.missouri.edu
borens@health.missouri.edu

Randolph County Caring Communities Partnership: A Community Level, Sustainable, Health and Healthcare Delivery System

Missouri, like many states, has a significant issue with adequate access to healthcare services in rural areas. The Health Management and Informatics Department (HMI) at the University of Missouri has supported the development of a sustainable, but non-traditional, solution, in Randolph County that leverages health and healthcare services provided and orchestrated by a non-clinical provider. Randolph County Caring Community Partnership (RCCCP) has worked extensively with HMI to lay the foundation for a community level, sustainable, health and healthcare delivery system. For the last 9 years HMI has supported RCCCP in their strategic planning efforts which led to HMI (students and faculty) creating an enterprise information architecture about 8 years ago. Use of this architecture enables RCCCP to better collect and manage the data it needed to increase the type and acuity level of the services it offers (see https://rccaringcomm.org/)and enabled, in 2014, RCCCP's adoption of a community level EHR. HMI continues to assist RCCCP as it upgrades the EHR and expands its use. Beginning in 2015, RCCCP used it strategic planning to determine a new enterprise objective of establishing an Accountable Community for Health (ACH). With HMI's help (3 student Executive Management Services teams, several faculty and four HMI interns) RCCCP has developed the data necessary to underpin the development of an ACH and is proceeding along those lines. In 2017, a team of 3 students and one faculty developed financial sustainability plans to help RCCCP bridge the expected 10 year gap from the time grant funding (for the ACH) ends and the time the ACH is mature. In 2018, HMI (students and faculty) are building an enterprise information architecture for the ACH with RCCCP as the bridge organization. Currently, this architecture supports the near real time flow of data across the social service, law enforcement and clinical services domains. This long term working partnership aimed at creating a replication model of sustainable health and heath care in a rural envorement has improved the lives of residents of Randolph County, assisted a social service agency to grow and mature, provided a cutting edge training environment for graduate students and opportunities for faculty to research and increase their fund of knowledge.

Sustainability Office

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Sustainability Efforts On Campus

- In 2017 the University of Missouri received its first Leadership in Energy and Environmental Design (LEED) Platinum-level building certification for sustainable practices implemented during design and construction of Wolpers and Johnston Hall. At 173,6700 gross square feet, the renovation project also represents the University's largest LEED-pursuing project to date. This project brings the total LEED projects earning certification across campus to nine, with over half of the projects achieving Gold-level or above. Seven additional projects are currently pursuing LEED certification across campus including residential, medical, educational and athletic facilities.

9 • LEED Certified Projects
1. Missouri Orthopaedic Institute • *CERTIFIED*
2. Animal Resource Center • *CERTIFIED*
3. Health Care Patient Care Tower • *GOLD*
4. Women's and Children's South Pavilion • *SILVER*
5. Gwynn Hall Renovation • *GOLD*
6. Swallow Hall Renovation • *GOLD*
7. Gateway Hall • *GOLD*
8. Johnston & Wolpers Hall Renovation • *PLATINUM*
9. Softball Stadium • *GOLD*

8 • LEED Pursuing Projects
10. Dobbs Group Replacement Project
11. Missouri Orthopaedic Institute Addition
12. Patient Centered Care Learning Center
13. Stewart Hall Renovation
14. East Campus Plant Growth Facility
15. Center for Missouri Studies
16. School of Music
17. Memorial Stadium South Expansion

Projects Applying MU's Sustainability Standards
19. Tate Hall
20. Switzler Hall
21. Lafferre Hall
22. Vet Med Ambulatory Teaching Facility
23. UMHC - West Wing Expansion
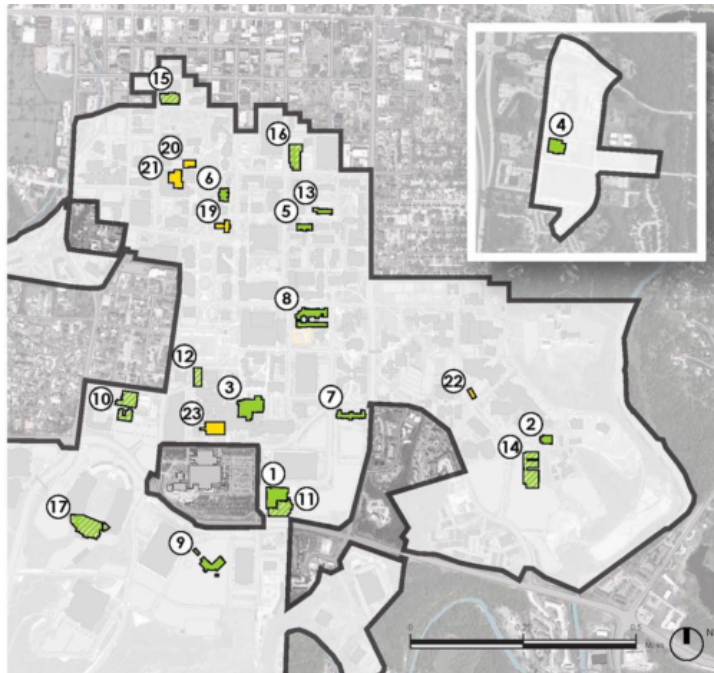
- MU implements a broad-based recycling program covering all areas of the campus and even including events, such as football games at Faurot Field and concerts at Jesse Auditorium. MU's recycling program also includes Tiger Treasures, which collects and sells unwanted items donated by students departing for the summer from MU Residential Life facilities as well as fraternity and sorority houses. This project diverts tons of material from the landfill, and proceeds from the sale benefit our local University Y.
- Our campus Combined Heat and Power (CHP) Facility is recognized as one of the most efficient plants in the nation by the EPA Energy Star CHP Partnership. This high level of efficiency reduces costs and emissions for MU compared to traditional power plants.
- Campus is nationally recognized as a botanic garden and has been certified as the 15th Bee Campus USA affiliate in the nation. The landscaping uses minimal amounts of fertilizer and has implemented Integrated Pest Management. The grounds host many native plants and even a butterfly garden.
- The MU Office of Sustainability strives to make bicycles a safe and affordable option for commuting, to reduce environmental impact through the use of non-motorized transportation and to encourage personal health through exercise. With that said, MU Sustainability offers a free 24-hour bike rental with the help of the MU Bike Share Program and free bike repairs for students' personal bikes via the Bike Resource Center.

STARS Performance at MU

STARS stands for Sustainability Tracking, Assessment and Rating System. This system is administered by the Association for the Advancement of Sustainability in Higher Education also known as AASHE. The sustainability-focused framework STARS has developed helps engage and recognize secondary education institutions from all types of backgrounds, from public community colleges to private universities, for their efforts to be a sustainable campus year-round.

- We take great pride in the fact that the University of Missouri is one of only four schools in the Southeastern Conference to earn a gold STARS rating. Many members of the campus community work tirelessly to make MU a leader in sustainability. Understand how we rate so you can help us improve our efforts campus-wide.

- MU Received a 100 percent rating on academic courses which is categorized under curriculum. The university was honored for offering over 200 undergraduate courses that focus on sustainability and 138 graduate courses that focus on the topic as well.
- Our campus engagement received a rating of 20.50/21.00. This was in part due to our student educators, MU Sustainability Student Ambassadors, who provide outreach and learning opportunities on a variety of sustainability-focused issues. Additionally, campus engagement highlighted MU's student organization Sustain Mizzou. This student group promotes sustainability as a way of life, providing their peers with an array of sustainability projects on and off campus.
- An area that MU would like to continue to strengthen is our waste minimization and diversion. Each faculty, staff, student and visitor can do his or her part by visiting our recycling resources page or requesting a brief recycling presentation to understand what is recyclable and what is not. By properly recycling, our contamination levels decrease, our waste minimization levels improve and more materials will be diverted from the landfill.

MU Sustainability Monthly Newsletter

- November Newsletter
- October Newsletter

Sign up to have the monthly newsletter emailed to you!

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MU University of Missouri

Sustainability Office

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About Us

Mission

The University of Missouri's Sustainability Office seeks to ingrain sustainability principles of social equity, environmental stewardship and economic prosperity while integrating campus operations, academics and research. This is done through collaboration with students, faculty and staff to provide support, resources, education and leadership opportunities that lead to an empowered community willing to address sustainability issues on campus and beyond.

Vision

Mizzou's Sustainability Office is the focal point and catalyst for sustainability related operations, education, research, activities and planning on a campus that implements the Missouri Method in serving as a living laboratory for sustainability.

Core Functions

Information Hub

Serve as a repository of information on sustainability resources and activities for the Mizzou campus community. Information on existing sustainability related curricula, research, practices and activities is collected and made available to the campus community. This information is expected to influence evolution of campus sustainability by affecting campus goals, priorities and policies.

Inter-Departmental Coordination

Mobilize campus to infuse sustainability by bridging people, disciplines, departments and ideas; facilitate collaborations, networking and partnerships while fostering a culture of sustainability. The Office also cultivates and supports relationships with external organizations to exchange sustainability expertise.

Capacity Development

Empower campus stakeholders to understand and integrate sustainability principles in their area of influence and operation. Provide support towards translating sustainability principles into actual actions on the ground. The Office provides support to identify and prioritize initiatives for campus sustainability efforts..

Implementation Support

Raise awareness and give prominence to opportunities for optimizing responsible use of human, natural and capital resources. Enable campus stakeholders to avail these opportunities by providing support in the form of regular assessments, reviews and analysis.

Communication and Outreach

Build synergy across campus by effectively communicating knowledge, practices, metrics and achievements in sustainability with campus community and general public.

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employer.

Sustainability Office

MU Sustainability Policy

On March 18, 2010, the University of Missouri officially adopted its current Sustainability Policy Statement:

The University of Missouri embraces its role in providing a healthy and safe learning environment for its students, staff, and faculty. Consistent with MU's mission and values, we are committed to leadership in demonstrating local and global sustainability stewardship. MU recognizes the increasing need for policies and practices that reduce greenhouse gas emissions and has signed the American College and University President's Climate Commitment with the goal of making the MU campus carbon neutral. Further, MU has undertaken an ambitious program of sustainability that includes, but is not limited to, the following actions:

- Incorporating sustainability and social responsibility in the teaching curriculum; researching, testing, and implementing new sustainability initiatives; and disseminating effective sustainability practices.

- Taking proactive steps to preserve, protect, and renew natural resources, both locally and globally, thereby minimizing anthropogenic harm to the environment.
- Identifying and utilizing environmentally friendly energy resources and employing a dynamic and proactive energy-conservation program.
- Minimizing waste generation, recovering recyclable materials and safely managing necessary waste disposal.
- Observing sustainable best practices in campus construction and procurement.
- Researching and promoting sustainable practices in the growth, management, and transportation of food.
- Promoting clean, efficient, and healthy transportation for all students, staff, and faculty.

Each unit or department within the University is expected to evaluate current policies and practices on a regular basis with the goal of adopting and improving environmentally sustainable practices.

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Campus Resources

From Bradford Farm collecting 3,000-4,000 pounds of compost each week from Campus Dining Services to the Sustainability Office and RecyclInk working together to recycle and refill campus ink cartridges, the university continues to make great strides in being environmentally friendly as well as socially responsible. Explore the following tabs to understand our campus resources further:

- Recycling
- Food
- Education and Research
- Transportation
- Energy
- Mizzou Botanic Garden

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Education and Research

Sustainability is so much more than recycling. It is the process of "maintaining change in a balanced fashion, in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations(1)."

Undergraduate and Graduate Sustainability Courses at MU

The University of Missouri offers undergraduates 203 sustainability courses to choose from and over 1,000 courses that include sustainability content. For students interested in graduate school, the university offers a total of 138 sustainability courses and 754 courses that include sustainability content.

Students and potential students who are interested in learning more about sustainability courses can find class names and course descriptions in the Sustainability Tracking, Assessment and Rating System (STARS) Courses Inventory PDF here.

Sustainability Programs

Sustainable Agriculture

Sustainable agriculture involves practices that protect the environment, public health and animal welfare while still producing food, fiber and fuel that we rely on each and every day. By looking at areas such as soil health, plant health, water quality, and agricultural policies, researchers and producers can work together to create the products we need without compromising the environment or society.

- Sustainable Agriculture – University of Missouri Extension Resources
- Agriculture with Emphasis in Sustainable Agriculture – University of Missouri Degree Program
- Sustainable Agriculture – Career Opportunities

Environmental Sciences

Environmental sciences integrates physical, biological and information sciences to the study of the environment. This field strives to find sustainable solutions to environmental problems. Scientists research topics such as earth processes, effects of global climate change, evaluating alternative energy systems and so much more.

- Environmental Sciences – Career Opportunities
- Environmental Sciences – University of Missouri Degree Program
- Certificate in Environmental Studies
- Office of Multidisciplinary Degrees – Environmental Studies

Human Environmental Sciences

Human environmental sciences helps address human needs to enhance an individual's life. This can be achieved by conducting research, preparing professionals and providing outreach. The Family Impact Center and the Child Development Lab are just two of the many MU-affiliated examples of human environmental sciences in action.

- College of Human Environmental Sciences
- Family Impact Center
- Human Development and Family Science – Child Development Lab

Geography

Geography can explore environmental impacts, the complexities between the natural world and human behavior, and it can also focus in on understanding societal issues such as climate and vegetation change.

- Geography with an Emphasis in Physical and Environmental Geography – University of Missouri Degree Program
- Geography with an Emphasis in Human, Regional and Cultural Geography – University of Missouri Degree Program

Sustainable Energy and Policy

When looking at sustainable energy and policies, this focus is on renewable energy sources, sustainable practices in manufacturing and technology, as well as the impact of energy usage on our society, our economy and our environment.

- Graduate Certificate in Sustainable Energy and Policy
- Chemical Engineering with an Environmental Emphasis – University of Missouri Degree Program

Natural Resource Management

Natural resources such as water, air, plants and animals are vital to our survival. Natural resource management helps to create, manage and restore urban ecosystems in a sustainable fashion. Natural resource management can also help with conservation efforts of plant and animal species in forests, grasslands and streams.

- Natural Resource Science and Management – University of Missouri Degree Program
- What are Natural Resources – Conserve Energy Future

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Sustainability Reports

From the Sustainability Tracking, Assessment and Rating System (STARS) to climate action plans, MU measures their sustainability-focused efforts as a way to continuously provide a safe and healthy environment for our students, staff, faculty and visitors. Listed below are the sustainability reports that MU takes part in or produces:

- LEED Buildings
- STARS
- Climate Action Plan
- Bee Campus USA
- Tree Campus USA

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STARS

STARS stands for Sustainability Tracking, Assessment and Rating System. STARS is administered by the Association for the Advancement of Sustainability in Higher Education also known as AASHE.
The sustainability-focused framework STARS has developed helps engage and recognize secondary education institutions from all types of backgrounds, from public community colleges to private universities, for their efforts to be a sustainable campus year-round.

2018 MU STARS Highlights

Curriculum 27.20/40.00
MU Received a 100 percent rating on academic courses which is categorized under curriculum. The university was honored for offering over 200 undergraduate courses that focus on sustainability and 138 graduate courses that focus on the topic as well.

Innovation 4.00/4.00
Recognized for our hard work with four different
innovations including MU-Based Program Tools for Educators Supporting Children Involved in Natural Disasters and Crises.

Research 16.00/18.00
When referring to the research and scholarship portion categorized under Research, MU received 12/12 points for their efforts. Approximately 71 percent of MU's faculty and staff researchers are engaged in sustainability research.

Waste Minimization and Diversion 2.39/8.00
An area that MU greatly needs your assistance on is waste minimization and diversion. According to our statistics we are not recycling materials in the correct bins and we are throwing trash and food into the recycling bins as well. These actions lead to high contamination levels. Find out what you can do to help by visiting our recycling pages.

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Tree Campus USA

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The **Sustainability Tracking, Assessment & Rating System™** (STARS) is a transparent, self-reporting framework for colleges and universities to measure their sustainability performance.

Reporting Tool

Register   About   Participate   Reports   Support   [Search]

Home / STARS Institutions / University of Missouri / Feb. 16, 2018

University of Missouri
Columbia, MO, US

Rating	Score	Liaison	Submission Date	Executive Letter
Gold	69.30	Srinivasan Raghavan	Feb. 16, 2018	Download

Institutional Characteristics

Institutional Characteristics +

Academics

Curriculum +	27.20 / 40.00
Research +	16.00 / 18.00

Engagement

Campus Engagement +	20.50 / 21.00
Public Engagement +	14.37 / 20.00

Operations

Air & Climate +	7.99 / 11.00
Buildings +	2.64 / 8.00
Energy +	6.14 / 10.00
Food & Dining +	2.00 / 8.00
Grounds +	2.77 / 4.00
Purchasing +	3.04 / 6.00
Transportation +	3.15 / 7.00
Waste +	4.31 / 10.00

STARS v2.1

INSTITUTIONAL CHARACTERISTICS

INSTITUTIONAL CHARACTERISTICS

IC-1: Institutional Boundary
IC-2: Operational Characteristics
IC-3: Academics and Demographics

ACADEMICS

CURRICULUM

AC-1: Academic Courses
AC-2: Learning Outcomes
AC-3: Undergraduate Program
AC-4: Graduate Program
AC-5: Immersive Experience
AC-6: Sustainability Literacy Assessment
AC-7: Incentives for Developing Courses
AC-8: Campus as a Living Laboratory

RESEARCH

AC-9: Research and Scholarship
AC-10: Support for Research

Water +	6.46 / 7.00

Planning & Administration

Coordination & Planning +	4.25 / 8.00
Diversity & Affordability +	8.85 / 10.00
Investment & Finance +	0.03 / 7.00
Wellbeing & Work +	2.20 / 7.00

Innovation & Leadership

Exemplary Practice +	1.00
Innovation +	4.00

The information presented here is self-reported. While AASHE staff review portions of all STARS reports and institutions are welcome to seek additional forms of review, the data in STARS reports are not verified by AASHE. If you believe any of this information is erroneous or inconsistent with credit criteria, please review the process for inquiring about the information reported by an institution and complete the Data Inquiry Form.

OP-13: Cleaning and Janitorial Purchasing

OP-14: Office Paper Purchasing

TRANSPORTATION

OP-15: Campus Fleet

OP-16: Student Commute Modal Split

OP-17: Employee Commute Modal Split

OP-18: Support for Sustainable Transportation

WASTE

OP-19: Waste Minimization and Diversion

OP-20: Construction and Demolition Waste Diversion

OP-21: Hazardous Waste Management

WATER

OP-22: Water Use

OP-23: Rainwater Management

PLANNING & ADMINISTRATION

COORDINATION & PLANNING

PA-1: Sustainability Coordination

PA-2: Sustainability Planning

PA-3: Participatory Governance

DIVERSITY & AFFORDABILITY

PA-4: Diversity and Equity Coordination

PA-5: Assessing Diversity and Equity

PA-6: Support for Underrepresented Groups

PA-7: Affordability and Access

INVESTMENT & FINANCE

PA-8: Committee on Investor Responsibility

PA-9: Sustainable Investment

PA-10: Investment Disclosure

WELLBEING & WORK

PA-11: Employee Compensation

PA-12: Assessing Employee Satisfaction

PA-13: Wellness Program

PA-14: Workplace Health and Safety

INNOVATION & LEADERSHIP

EXEMPLARY PRACTICE

IN-1: Sustainability Course Designation

IN-2: NSSE Sustainability Education Consortium

IN-3: Academy-Industry Connections

IN-4: Green Athletics

IN-5: Green Event Certification

IN-6: Hospital Network

IN-7: Fair Trade Campus

IN-8: Certified Green Cleaning

IN-9: Green Laboratories

IN-10: Sustainable Dining Certification

IN-11: Grounds Certification

IN-12: Pest Management Certification

IN-13: Spend Analysis

IN-14: Bicycle Friendly University

IN-15: Stormwater Modeling

IN-16: Campus Water Balance

IN-17: Natural Wastewater Systems

IN-18: Pre-Submission Review

IN-19: Community Stakeholder Engagement

IN-20: Pay Scale Equity

IN-21: Adjunct Faculty Compensation

IN-22: Campus Pride Index

IN-23: Serving Underrepresented Groups

INNOVATION

IN-24: Innovation A

IN-25: Innovation B

IN-26: Innovation C

IN-27: Innovation D

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Get Involved

Whether you are looking for a way to become more involved with sustainability on campus or in your community, we have put together a list of possibilities to explore. Take a look at the variety of events MU Sustainability is hosting this semester, plus check out ways you can become a volunteer, student ambassador or employee!

- Events Calendar
- Volunteer
- Student Ambassadors
- Campus Involvement
- Community Involvement
- Employment

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Campus Involvement

Mizzou offers many ways you can get involved with campus sustainability. From peer education to student organizations to volunteering, YOU can make an impact at Mizzou. Help us make our campus a sustainable, environmentally friendly place to live, work and play! Below are a few, out of hundreds, student organizations to get involved in!

- Mizzou Alternative Breaks
- Sustain Mizzou
- MEAC
- Greeks Go Green
- Student Environmental Design Association
- Four Front Council (specifically includes Feminist Student Union, Four Directions: Indigenous Peoples Group, Jewish Student Organization and Muslim Student Organization)
- Mizzou Eco Racing
- Missouri Tigers for Tigers
- US Green Building Council
- Soil and Water Conservation Society
- Food Recovery Network
- Mizzou Unity Coalition
- LGBTQ Resource Center
- Multicultural Center

- [Wellness Resource Center](#)
- [Women's Center](#)
- [RSVP Center](#)

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Community Involvement

Sustainability happens on and off campus. Participating in civic engagement, community agriculture, waterway restoration and social justice are a few ways to expand your worldview. Below are wonderful local organizations to get involved with in Columbia.

- Stormwater Education
- Columbia Center for Urban Agriculture
- Missouri River Communities Network
- Missouri River Relief
- Community Garden Coalition
- Pednet Coalition
- Columbia Aquatic Restoration Program
- Tree Keepers
- Columbia Farmers Market
- City of Columbia – Office of Sustainability
- True North of Columbia
- City of Refuge

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