

THE COMMUNICATIVE VALUE OF EMR EDUCATION: MEDICAL STUDENTS'  
PERCEPTIONS OF INTRODUCTIONS TO EMRS

by

JUSTISS BURRY  
B.A. University of Central Florida, 2014

A thesis submitted in partial fulfillment of the requirements  
for the degree of Master of Arts  
in the Department of Writing and Rhetoric  
in the College of Arts and Humanities  
at the University of Central Florida  
Orlando, Florida

Summer Term  
2017

Major Professor: Blake Scott

©2017 Justiss Burry

## **ABSTRACT**

Research in medical education includes a number of studies that describe the complexities (Tierney et al., 2013; Gagon et al., 2009; Pippitt, Stevenson, & Samuelson, 2013), benefits (Milano et al., 2014; Hammoud et al., 2012; Silverman et al., 2014), and limitations (Peled, Sagher, Morrow, & Dobbie, 2009; Wald, George, Reis, & Taylor, 2014; Pelletier, 2016) of helping medical students understand and achieve fluency with electronic medical records (EMRs). In addition, studies in the rhetoric of health and medicine (RHM) have been calling to attention the effectiveness of rhetorical studies within medical contexts (Scott, Segal, & Keranen, 2013; Segal, 2005; Rausch, 2016; Fountain, 2014; Melocon and Frost, 2015; Graham and Herndl, 2014). However, there is not a unified idea of the best way to teach EMR fluency, nor is there any research that studies and analyzes the perceptions of students in their undergraduate medical education, including their pre-clerkship years. This thesis investigates students' perceptions of their medical education at the University of Central Florida's College of Medicine (UCF COM), specifically how 76 students who participated in surveys and focus group interviews perceive and engage with their education and ideas of EMR application and fluency. It also compares their perceptions with the goals of the module directors who designed the curriculum. In its analysis, this thesis employs classical and contemporary scholarship about stasis theory (Crowley and Hawhee, 2012; Fahnestock and Secor, 1988) to identify points of congruence and dissonance between students and module directors, as well as across cohorts of students in their first, second, and third years.

Through data analysis, I found key points of congruence and dissonance between the perceptions and experiences of students and goals of module directors. I also identified key factors affecting both groups, such as the time constraints of the curriculum and the fact that hospitals use different EMR systems. The results of this study demonstrate the complexities of medical education and EMR education for both students and module directors. By understanding how rhetoric can be more beneficial to other fields, such as medical education, this study can help those creating curricula better reach outcomes that both students and licensing boards will appreciate. That said, more research needs to be conducted to understand how regulated medical education creates these points of contention between future physician curriculum designers.

To J. Blake Scott, for your vital role in helping me find this field and helping me every day with not only professional successes but personal ones too.

To R. Mark Hall, for your continued support throughout my non-traditional trek through both undergraduate and graduate school. You started this whole process for me five years ago. ☺

To my husband, Matthew Burry, who not only supported me throughout this graduate school process but also inspired the idea of this project.

And to our kids, Nick and Ben, who pretended to be interested in my work, while I pretended to know what “off sides” actually means. ☺

## **ACKNOWLEDGMENTS**

This thesis would not have been possible without the continued support and help from the incredible people who supported me on this journey.

Thank you first to Dr. J. Blake Scott for your continued and relentless investment in me as a person and graduate student; your impact on my life will remain forever.

Thank you to the UCF College of Medicine, especially to Drs. Castiglioni, Bellew, and Hernandez, for supporting this research and allowing me to conduct research when everyone was so busy.

Thank you to my committee for your questions and for supporting me during this lengthy process.

Thank you to the entire faculty and staff in the Department of Writing & Rhetoric, as every one of you have played a pivotal role in my success.

Thank you to my cohort for always being there to help when I needed it.

# TABLE OF CONTENTS

LIST OF FIGURES .....	x
LIST OF ACRONYMS.....	xi
CHAPTER ONE: INTRODUCTION AND LITERATURE REVIEW .....	1
Personal, Social, and Ethical Exigencies.....	4
Personal Exigence .....	5
Social Exigence .....	5
Ethical Exigence .....	9
Literature Review .....	10
Overview of Remaining Chapters.....	14
CHAPTER TWO: THE COMPLEXITIES OF EMR EDUCATION IN MEDICAL SCHOOLS AND PEDAGOGICAL APPROACHES .....	16
Curriculum 2.0.....	18
Real-World Experience .....	20
Hands-Off Real-World Experience.....	23
tEHR Programs .....	24
Sim-EHR Programs.....	28
Relationship of Approaches to UCF Curriculum.....	32
CHAPTER THREE: METHODOLOGY .....	38
Theoretical Framework.....	38
Data Collection Methods .....	40
Data Analysis Methods .....	50
Initial Code Identification From Surveys.....	51
Testing Initial Codes Then Adding to Focus Group Interview Data .....	53
Developing Three Overall Codes .....	55
Identifying Key Points of Dissonance and Congruence.....	60

Preview of Next Chapter .....	64
<b>CHAPTER FOUR: RESULTS OF DATA ANALYSIS BETWEEN COHORTS AND MODULE DIRECTORS .....</b>	<b>66</b>
First Major Comparison: Comparison Across Student Cohorts.....	69
Logistics and Usability.....	71
Generational Age Gap.....	76
Education .....	77
Policy.....	79
Second Major Comparison: Comparison Between Module Directors and Students .....	80
Logistics and Usability.....	84
Generational Age Gap.....	85
Education .....	86
Policy.....	88
Preview of Next Chapter.....	90
<b>CHAPTER FIVE: CONCLUSION.....</b>	<b>91</b>
Review of Previous Chapters.....	91
Review of Findings.....	93
Implications of this Study.....	94
Medical Education and Practice .....	95
The Rhetoric of Health and Medicine .....	97
Points of Potential Future Research .....	98
<b>APPENDIX A: IRB APPROVAL FORM .....</b>	<b>100</b>
<b>APPENDIX B: WRITTEN THEORETICAL MEMO .....</b>	<b>102</b>
<b>APPENDIX C: FIRST VISUAL MEMO .....</b>	<b>107</b>
<b>APPENDIX D: COMPARATIVE CHART ABOUT EMRS .....</b>	<b>109</b>
<b>APPENDIX E: UCF COM SURVEY QUESTIONS .....</b>	<b>113</b>

APPENDIX F: DATA REDUCTION CHART PHASE TWO M3 AND MODULE

DIRECTORS .....117

APPENDIX G: FOCUS GROUP QUESTIONS .....121

REFERENCES .....124

## LIST OF FIGURES

Figure 1: THE GENERAL EDUCATION REQUIREMENTS STUDENTS ARE REQUIRED TO MEET .....	31
Figure 2: M1 INITIAL SURVEY CODES .....	51
Figure 3: VISUAL REPRESENTATION OF CODING FOCUS GROUP INTERVIEWS .....	53
Figure 4: INITIAL CODING DEVELOPING THREE MAJOR CODES .....	55
Figure 5: COMPARATIVE CHART OF MODULE DIRECTORS' AND STUDENTS' DATA POINTS .....	59
Figure 6: WHAT ALL STUDENTS FELT TAUGHT THEM THE MOST ABOUT EMRS .....	83

## LIST OF ACRONYMS

AAMC	American Association of Medical Colleges
ACGME	Accreditation Council for Graduate Medical Education
COP	Community of Practice
EHR	Electronic Health Records—these are synonymous with EMR
EMR	Electronic Medical Records—these are synonymous with HER
HIT	Healthcare Information Technologies
IU-SM	Indiana University School of Medicine
MPG	Midwest Pain Group
NIH	National Institute of Health
NYU-SM	New York University School of Medicine
OHSU	Oregon Health & Science University
RHM	The Rhetoric of Health and Medicine
Sim-EHR	Simulated Electronic Health Record
tEHR	Teaching Electronic Health Record
UCF COM	University of Central Florida College of Medicine

## **CHAPTER ONE: INTRODUCTION AND LITERATURE REVIEW**

This chapter's aim is to introduce the research project that I have completed over the course of the past year, as well as preview the rest of this thesis. The overall purpose of this research study is to examine how the curriculum at the University of Central Florida's (UCF) College of Medicine (COM) incorporates electronic medical records (EMRs) into students' undergraduate medical education. Here, undergraduate medical education refers to the students' first four years of medical school. When students graduate and place within a specialty, this is called graduate medical school education, or their residency. This project is only looking at undergraduate medical school education. Regardless of year within this education, EMRs are used in everyday practice within the medical field, particularly in the documentation of patients' health and health needs between the patient, physicians, hospital, and insurance company. These records are pertinent to not only diagnosing a patient's needs but also ensuring patients have more autonomy over their healthcare. There are some in the medical field who hold that the patient will have this autonomy by gaining access to their medical record, or the electronic health record (EHR). There are subtle differences in the meanings of these two terms. EHRs refers directly to the larger technological infrastructure supporting patient's medical records, as well as ways patients can interact with them, whereas EMRs refer to the actual record for the patient that they may or may not have direct access to. For the purpose of this study, I chose to employ the term EMR, as I am more interested in understanding the students' perceptions of EMRs at UCF COM. Additionally, the UCF COM employs the term EMR, thus facilitating a streamlined understanding and use of this acronym throughout this study. To that end, this project aims to better understand how medical students are introduced to EMRs in the first three years of

medical school education, and how these first three years shape students' perceptions, values, and expectations about using EMRs, particularly related to physician-patient communication and interaction through the concept of fluency.

This project realizes that the Liaison Committee on Medical Education (LCME), the governing body that determines the values and benchmarks that undergraduate schools need to meet for accreditation, is an important part of medical school education. However, there is not a specific way the LCME defines fluency. In order to end this, I first started with the LCME and the governing body in charge of it, the American Association of Medical Colleges (AAMC).

The AAMC, which oversees the LCME, elects specific people and committees to the LCME in order to establish benchmarks, specifically for undergraduate medical education. In other words, the AAMC governs the LCME, which in turn governs undergraduate medical education. One of UCF COM's required benchmarks is teaching students about fluency. So, I went to these administrative websites and looked for what was meant by this term. I found that although there is not a standard definition outlined by either governing body that explains what is meant by the term, fluency there are some ideas published by the AAMC which might better elucidate what is valued. To better define fluency, we first need to take a step back and look what is meant by literacy, since, in this field, literacy is used to inform fluency. The definition of what may constitute literacy by these boards rests within an article published by AAMC in their 2012 volume. The article by Bayley, McLellan, and Petropoulos (2012) describes what they consider to be an effective definition of literacy and asserts that there are four levels of performance with tools that help students succeed in practice, and EMRs are part of this practice:

1. Literacy – knowing and understanding of the EBM (evidence-based medicine) concepts;
2. Competency – being able to apply these concepts in controlled conditions;
3. Fluency – having a comfort level with incorporating the concepts in daily practice; and
4. Expertise – having the high level of skill needed to create and demonstrate the tools that translate research into practice.

The third component, or tool is described as “Fluency – having a comfort level with incorporating the concepts into daily practice” (p. 1470). Bayley, McLellan, and Petropoulos (2012) utilize this notion of fluency for what students should be learning in medical school education, and the governing body published it in their journal. As such, I hold that this definition has validity in how fluency in medical education is held. Put another way, Bayley et al. (2012) argue that the *doing* is how students learn best within undergraduate education. These researchers extrapolate this information from an article written by Marcum (2002) that critiques information literacy, while supporting the position that literacy can only be truly achieved while working in the workplace. Again, this suggests that medical education values the actual *doing* of EMR work in order for students to better understand literacy and EMRs. In fact, Bayley, McLellan, and Petropoulos (2012) propose that undergraduate medical education should be focused “on providing training and support for processes that can be readily integrated into regular practice routines” (p. 1470). While using the working definition of fluency put forth by Bayley et al. (2012), this study seeks to understand how faculty overseeing undergraduate medical education about medical practice, for first through third year students (M1-M3),

designed their introduction to EMRs, the rationale for this design, including how it prepares students to gain fluency with EMRs, and what these faculty curriculum developers hope students will gain from their education.

Balyley et al. (2012) also seek to understand how students assess the effectiveness of these approaches, which include lectures about EMRs, training around patient histories, and work with Community of Practice preceptors. Briefly, preceptors are established practitioners who volunteer to have medical students observe them, in order for these students to see concepts they have learned in practice. The results of this study will be shared with the UCF College of Medicine (per their request), to allow curriculum developers at UCF COM to better assess how well their intended training matches student perceptions. It should be noted that this study is in no way an assessment of the medical education curriculum. Rather, this study aims to better understand Module Directors' and students' understanding of their learning and EMR fluency. This research also has implications for EMR training at other medical schools who may be wondering how some students have perceived their curriculum and education at an undergraduate medical school. There are also implications for how rhetoricians of health and medicine might study such training, especially through the lens of stasis theory. The next section of this thesis project will discuss exigencies of this project, followed by the literature relevant to this study, and the chapter will end with a brief overview of the following chapters.

### **Personal, Social, and Ethical Exigencies**

The following sections explain the personal, social, and ethical motivations for this project. Within these sections, I also define what I value while considering this study, as well as how other elements influenced this study.

## **Personal Exigence**

The personal exigence of this research project stems from my interest in medical records, as my partner is a medical doctor. As such, I have noticed some of the changes within documentation and patient care and how these notions are shaped, vicariously, through my partner's experiences in practice. Noting that, over the past eight years, these practices have changed drastically, made me wonder how and why they change the way they do. Observing these changes and patterns has led me to consider the rhetorical value of EMRs, not only in practice but also in educating future physicians. By asking my partner about his experiences in undergraduate medical school, I began to look into the relationship between educational training and student experience, especially when considering how concepts like fluency are taught within EMR education.

## **Social Exigence**

The social exigence of this research is to better understand how physicians-to-be are trained and whether training and curricular goals are attained as described by the medical school's curricular goals, as well as those standards set by the national licensing board, LCME. According to their website (AAMC, 2017), this committee is responsible for federally and locally accrediting medical schools in the U.S. and Canada. This governing body has created benchmarks for student learning that medical schools must abide by, but this committee does not provide a road map on how to better reach these benchmarks. In other words, medical schools across the country teach EMR education using various approaches, which garner varying degrees of success. Since EMR education is not something that is streamlined, this study also hopes to add to the body of knowledge surrounding EMR education. It should be noted that this research

may be used by future medical schools when developing medical school curricula, as there will be an inside look into how students perceive their EMR education.

For example, UCF COM is aiding in this project because they are curious to find out how their EMR curriculum compares to other programs, as well as how their curriculum is perceived by the students they teach. While not evaluative of the curriculum of UCF COM, this study will generate a report they may use in their accreditation in October 2017, in order to provide evidence that they are working to satisfy LCME standards. As such, they were helpful with collecting data for this study. This study will contribute to the field of medicine and how students as well as Module Directors understand the roles of teaching and implementing medical education curricula around EMRs, including the complexities that electronic medical records add to the patient-physician relationship. As the incorporation of EMR training is becoming more important and is required for accreditation, this study could assist medical schools in identifying strengths and weaknesses of training future physicians in relation to EMRs and student engagement.

In addition to the social exigency described above, this project that can better illuminate the field of rhetoric and composition. As a student in a Writing and Rhetoric program, I began to search for information about the rhetorical purposes and practical applications of health and medicine. This led me to enroll in a special topics class with Dr. J. Blake Scott. In this class, we began to explore the field of RHM. As we approached this topic, I began to read about the work being done in the field. In fact, I found that in Writing and Rhetoric, rhetorical studies of health and medical practices have constituted a new field. This field has been exemplified by work from Meloncon and Frost (2015) and Scott, Segal, and Kerenan (2013), among others. This field seeks

to find various contexts and places within health and medicine to study and learn about writing practices and communication. This study contributes to the field of the rhetoric of health and medicine by adding to understandings of how medical education about EMRs shapes the perceptions and values of physicians in training, including the roles and effects of EMRs in physician-patient interaction and communication. This study is important to this burgeoning field, as it creates a space for future researchers to explore EMRs as they pertain to communication and writing. Particularly in the field of the RHM, this study is one of the first of its kind and opens a space for future investigation into the discursive practices of EMRs and their implications.

This study will also contribute to RHM by using a mixed-methodology involving both rhetorical analysis, which employs stasis theory, and qualitative data collection and analysis. The methodological implications of this study are also important to the field of rhetoric as it provides a way to study the implicit and explicit arguments about how EMRs may be perceived and valued within education and practice. One way to view these arguments and analyze what is happening within medical education is by employing rhetorical stasis theory. Crowley and Hawhee (2012), eminent scholars in the field of RHM, define stasis theory as “as heuristic—a means of discovery. We state the issue both theoretical and practically and consider what happens when we state its available proposition at various levels of generality. Then we subject its available propositions to the four questions to see if we can discover persuasive arguments...” (p. 73). In other words, using four types of questions, Crowley and Hawhee (2012) hold that different points of persuasion can be extolled from data. Rhetoricians have identified four stasis types of questions that may or may not be found in every argument: conjecture/fact, definition,

quality, and policy. Crowley and Hawhee (2012) give examples of how these questions may appear. These stasis types ask questions such as:

1. Did something happen, and what are the facts about it (p. 67)?
2. What is the nature of the thing, and how can we define it (p. 68)?
3. Is the thing and its effects good or bad, and is it better or worse than something else (p. 69)?
4. What should be done about it, and would these actions make it better or worse (p. 71)?

Together, these questions may help illuminate what is happening with EMR education by providing a way to identify and understand how this education is framed rhetorically by participants, as well as key points of congruence and incongruence between program goals and student perceptions and values.

As such, the central research questions that this study addresses by noting these social exigencies are the following:

- How are EMRs incorporated into the first three years of the medical education curriculum at the UCF College of Medicine?
- What are the program's goals for developing fluency, according to the Module Directors' curriculum, of EMRs, and what kinds of stasis questions are these goals framed by?
- How does the UCF College of Medicine's curriculum engage, rhetorically and otherwise, medical students toward developing fluency with EMRs across the first three years?
- How does interacting with EMRs in various degrees during medical school training shape students' perceptions of how to employ EMRs in a clinical setting, and what kinds of stasis questions do these perceptions relate to?

- What do students expect to learn about EMRs from UCF COM, and how do they anticipate EMRs can be used in post-medical school practice?
- How do the program goals compare to student perceptions of expectations and experiences across the three years of EMR education, particularly in terms of the types of questions that foregrounded?

### **Ethical Exigence**

This section became imperative when the results in this study, Chapter Four, led me to realize another pertinent exigence located within both the fields of RHM and undergraduate medical education. Upon analysis of the collected data, I began to notice ethical issues arise, so I started to take note of the types of issues raised, by whom, and to what degree. As I paid attention to these notions of patient, student, and physician care, it became clear that there are notably issues that this type of work with EMRs and patients can, and should, provoke. This provocation was mainly manifested by things the Module Directors and students *did not* say. By this, I mean that communicative values and patient care sometimes got lost in the minutia of the curriculum. The majority of these ethical ideas revolve around a few key ideas.

The first idea is that undergraduate medical students, and physicians in general, should want to improve patient care and the agency of their own health. I say this because there is talk of the Hippocratic Oath that physicians take when completing medical school, and medical records were digitized, in part, to allow patients some control over their own health. The significance of the Hippocratic Oath is for physicians to pledge to never do harm and also to also have patients' interests at forefront. The logistics of these two things were noted by both groups of participants in this study, but neither group focused squarely on what the patient should or can

have control over in regards to their own health. As such, this dictates an ethical exigence in this study for me. The next ethical notion was the idea that patients may be objectified by physicians and those in practice because of the inherent nature of the medical record. To clarify what I mean by this, I will take a step back and explain what is relevant here for patients' narratives and their bodies as objects for insurance companies to bill. There is a depersonalization of the patient, by both the students and Module Directors, when it came to identifying the patient's narrative as part of a lived experience, as opposed to itemizing the patient's narrative in order to bill for the meeting time with the patient. After analyzing this data, I noticed that neither group in this study talked about the avoidance of objectifying patients and their histories in order to bill or complete their community of practice work. The patient's body was needed and used as a means of discovery without taking into consideration the patient's ideas of their own health and narrative.

These ideas required me to add this section to this study. That said, the rest of this chapter will address the relevant literature important to this research study followed by a brief synopsis of the following chapters.

### **Literature Review**

Since the field of RHM is relatively new, there is a lot of recent interdisciplinary research on issues in the medical field that pertain to a variety of stakeholders, such as, but not limited to, patient agency, medical policy, provider and patient communication, EMRs, and so on. There is also a lot of research in the medical field about the effectiveness of EMR implementation and what these records *do* in regards to provider and patient communication. In fact, a landmark study conducted by Gagnon et. al (2010) found that *ease of use* was one of the most important factors when implementing new technologies for Health Care Providers (HCPs). In their mixed-

methods review of 1,986 articles, they found that implementing new technologies within the medical field, such as electronic medical records (EMRs), is taxing and complicated. Thus, they call for users at every level in the healthcare field, including those in medical education, to contribute to the understanding and implementation of new information technologies. In the field of medical educational research, these issues are highlighted by the complex nature of EMRs and their relationship to medical students. A number of articles describe the complexities (Tierney et al., 2013; Gagon et al., 2009; Pippitt, Stevenson, & Samuelson, 2013), benefits (Milano et al., 2014; Hammoud et al., 2012; Silverman et al., 2014), and limitations (Peled, Sagher, Morrow, & Dobbie, 2009; Wald, George, Reis, & Taylor, 2014; Pelletier, 2016) of schools employing various ways of enlisting curriculum to teach medical students how to operate EMRs and assess their outcomes. These concepts also apply to some intersection of nursing school research and EMRs (Nickitas et al., 2010). Bayley et al. (2012) offer a particularly useful overview, proposing the four levels of performance as literacy, competency, fluency, and expertise. The most important, and the one these authors focus on for medical education, is fluency. They argue that comfortably and successfully incorporating concepts into practice is the basis of fluency. All-in-all, these articles outline various approaches to EMR education and attempt to find more engaging and effective ways to train future providers.

While the field of medical education is essential to examining EMR education, RHM can help medical education realize this objective by examining the discursive roles these electronic documents play in the education of medical students. In the field of RHM, there has been a call to define this field and realize its potential for helping other fields (Scott, Segal, & Keranen, 2013; Meloncon & Frost, 2015). A pinnacle work for RHM is Judy Segal's (2005) landmark

book, *Health and the Rhetoric of Medicine*. It explores and analyzes the ways patients and health care providers (HCPs) interact, which is interesting since EMRs have quickly changed the ways in which doctors and patients interact about health.

A prominent theory in classical rhetoric, stasis theory, has been applied to help identify the issues at play in a number of fields. As an illustration of stasis theory's expansive rhetorical application, Graham & Herndl (2011) explain how the informal arguments and conversation of a medical pain group, Midwest Pain Management (MPG), employs stases in their conversation. These stases illuminate what Fahenstock & Secor (1988) say in their article about using stasis to view what is happening with assumptions and values within stasis points. In order to do this, Graham & Herndl (2011) followed MPG and attended their meetings from June 2006 until November 2008. This article shows that RHM is applicable in more contexts than just rhetorical study and can be used for other fields. This article is particularly beneficial to me because I am also utilizing stasis theory in my own work, and this article allowed me to see how I might better construct a methodology for my study. Meloncon and Frost (2015) edited a special issue that explores how communication design and RHM can mutually benefit each other. In fact, they hold that "communication design can benefit from the perspective of the rhetorics of health and medicine, and health and medicine in general need communication design and the rhetorics of health and medicine" (p.11). In this way, Meloncon and Frost (2015) are advocating that this field can be beneficial to not only rhetoricians but also to other fields. In fact, another rhetorician, Fountain (2014), wrote a book titled: *Rhetoric in the Flesh*. This is the first ethnographic study of its kind that examines the gross anatomy lab. Through this examination, Fountain (2014) explains how rhetorical discourses, multimodal displays, and embodied

practices facilitate learning and technical expertise and how they shape participants' perceptions of the human body. Fountain (2014) explores the role that discourses, displays, and human bodies play in the training and socializing of medical students, thus contributing to the theoretical and practical understanding of the social and material factors in rhetorical medical education.

Studies conducted by rhetoricians of health and medicine who have explicitly engaged with EMRs may also be of use to this study. Most prominent is Susan Rauch and her graduate level work. Rauch's (2016) dissertation involves patient narrative, physician compliance, and EMR documentation. While building upon Segal's (2005) work with physicians and patients, Rauch (2016) extends the study of communicative aspects of EMRs, patients, and physicians further. Her work is situated within technical communication but is applicable to the RHM and rhetoric in general. In fact, Rauch (2016) explores how healthcare information technologies (HIT) are influential and elucidates how a "rhetorical attention-like structure often affects the integrity of electronic clinical documentation practices" (p. 16), which are essential to both the RHM and medical documentation practices. In fact, I hold that her work is crucial to what Scott, Segal, & Keranen (2013) have suggested: the RHM can help other fields such as technical communication, rhetoric, composition, and, I argue, medical practice and education.

As such, Rauch's (2016) work will greatly assist others in learning how communication between provider and patient is shaped by the required use of EMRs, and I intend to extend this idea to research medical education and their practices. In all of the aforementioned fields, however, there is an academic research gap about how the intended educational training of EMRs compares to students' perceptions of how these programs develop their "fluency". In

other words, there is not any research that has conducted a rhetorical analysis of what students' expectations for and perceptions of learning about EMRs in their first three years and using them in their subsequent and future practices. For example, Rauch's (2016) study explores how nurses learn to use medical concepts throughout their training and the actual work they practice. Other medical educational schools, identified by medical education researcher Rappleye (2015), such as Vanderbilt, the New York University School of Medicine, the Indiana University School of Medicine, and the Oregon Health & Science University, all approach EMR education differently, as chapter two outlines, but none of these studies account for student perceptions and values of their own medical education. As such, this research project set out to take the work they have set the stage for and add to the body of knowledge by addressing the gap in research of students' perceptions, values, and experiences of the undergraduate medical curriculum they interact with.

### **Overview of Remaining Chapters**

Chapter Two will explore how other schools and UCF COM approach and teach EMR education to undergraduate medical students. Following some examples from other schools and then comparing them to UCF COM curriculum, this chapter also notes the importance of various approaches taken by a number of medical schools in the nation. Then, this chapter attempts to answer why these are important to note before moving on to the next chapter.

Chapter Three is all about how this study was conducted and what methods were used in analyzing data. This chapter also delves into the theory utilized within this research: stasis theory. By understanding the theory employed within this study, the reader will have a better sense of not only how this research contributes to the fields of medical education and RHM, but also how to conduct such research projects in the future.

Chapter Four discusses the results of the research conducted and explores what patterns were found in the data after analysis. This chapter will also compare two main findings: those between the cohorts of students at UCF COM, as well as those comparisons between the Module Directors and students as a collective whole.

Lastly, Chapter Five will conclude this study and summarize the main points already mentioned. Next, this chapter will ask some questions of the reader to consider for future research, as well as note some of the implications for EMR education and the field of Writing and Rhetoric that directly resulted from this study.

## CHAPTER TWO: THE COMPLEXITIES OF EMR EDUCATION IN MEDICAL SCHOOLS AND PEDAGOGICAL APPROACHES

The purpose of this chapter is to explore the national contexts for the growing importance of EMR education with undergraduate medical students. This chapter explores the concepts of EMR education and the approaches taken by various U.S. medical schools. While there are myriad ways to best approach teaching EMR education, this chapter focuses on one specific component that is nationally recognized as a concept associated with EMRs and medical school accreditation that students need to better understand. This chapter tackles a definition of what fluency, or the act of *doing* the work, with EMRs is and how it operates for students within learning contexts in medical school, building up to the body of knowledge already there, as outlined by LMCE, AAMC, Bayley et al. (2012), and Marcum (2002). There are a lot of challenges associated with these pedagogical approaches as no two schools implement their curriculum in the same manner. There are also issues of school accreditation, and it should be noted that the federal healthcare system creates standards that these schools are required to teach to students. The American Recovery and Reinvestment Act of 2009 paved the way for widespread adoption and meaningful use of electronic medical records, which in turn created part of the exigency for teaching EMRs in medical curricula. The challenges issued with the ideas of fluency are many (see Lown & Rodriguez [2012], Morrow et al. [2009], Peled et al. [2009], Tierney et al. [2013], and Wald et al. [2014]). Synthesizing these articles, these challenges include streamlining medical EMR education for students and effectively covering concepts of fluency and giving students hands-on experience with EMRs. For example, the Tierney et. al (2013) piece illustrates that little is known about the effects EMR/EHRs have on

medical education based on an extensive review what has been documented about the complexities of EMR education. This article found that there are some medical professionals who support EMR implementation, while other professionals claim that EMRs are a hindrance to patient care. Using the ACGME's six competencies, these authors found that EMRs can be useful to medical education and teaching future physicians, but that students need to be engaged in the EMR process; in other words, students should be included in the implementation and use of EMRs. This article illustrates one of the main arguments of medical education for EMRs: student fluency.

Medical schools throughout the country have taken a variety of approaches to teaching EMR fluency. In fact, EMR and EHR are used interchangeably as they equate to the same thing, but different schools employ different acronyms. This chapter will use EMR and EHR interchangeably as well. The reason for this is that some schools utilize the term EHR, and I do not wish to change the way they speak about their program. This chapter will explore some of the various ways EMR education is implemented in various schools. As an overview, some schools choose to employ sim-EHR (simulated electronic medical records), tEHR (about electronic medical records), big data, curriculum implementation, and COP fellowships. In these ways, the types of student interactions with EMRs vary, ranging from lectures to observations with actual data to experience with simulated EMRs to real-world practice. The rest of this chapter will explore how these different programs introduce students to and teach them about EMRs and will start from the least interactive to the most. First, this chapter will discuss the major types of pedagogical approaches and specific examples of each, drawing heavily on

Rappleye's (2015) work with EMR education. Next, this chapter will outline how EMR training works across the first three years at the University of Central Florida.

### **Curriculum 2.0**

This type of approach for teaching EMRs is primarily concerned with how the students themselves are doing in their respective medical programs. In other words, Curriculum 2.0 programs have a strong affinity for focusing on students' individual learning styles and needs. This particular way of thinking about EMRs is not very interactive in its rare form, but some argue (see Wald et al., 2014) it provides a way for students to begin thinking about EMR work and the implications of EMRs within practice. This method of teaching EMRs also indirectly utilizes stasis theory by asking students to consider points of quality and fact. This is evidenced in this approach by defining what a student deems as learning-worthy (quality) within their education and what a lecture is and should entail (definitional). By asking students to consider these two potential stasis points, stasis theory is inherently a part of the learning process of these undergraduate medical students. One school, the Vanderbilt University School of Medicine is a prime example of such an approach.

According to Rappleye (2015), the Vanderbilt University School of Medicine utilizes a Curriculum 2.0 approach in order to address questions of curricular design as it pertains to teaching EMRs to their medical students. This program focuses on students' learning trajectories, patient records, and clinical outcomes. While all of these programs ask students to engage and interact with various components of EMRs, Vanderbilt's model is one that is the least interactive as it pertains to students physically working with EMRs. This is done by continually asking students how their EMR education can be improved. This model employs lectures as the main

source of relaying information to students. This program is focused on assessing each student's learning outcomes by their "portfolio coaches" and then using this information to better create models and lectures for teaching students about EMRs. Curriculum 2.0 does have an interesting dynamic to it. Students are separated from high performers to low performers, based on the assessment of each student's learning trajectory. Lower performing students are then taught about EMRs based on the suggestions and information gathered from the higher performing students. This type of EMR education asks students to listen to lectures and recursively uses strategies that higher performing students adapt. In this way, this program aims to aid students in learning about EMRs by asking the higher performing students what worked well for them, and then applying these suggestions for students who are not as high performing. However, Morrow et al. (2009) found that when first-year medical students are taught explicitly how to manage EMR with patients, they respond with EMR-specific communication skills that will be helpful in future practice. These authors hold that their "results suggest that first-year medical students can learn EHR-specific communication skills early in their medical education in a brief educational intervention" (p. 31). Lectures are effective for teaching students about EMR fluency, even if this type of pedagogical approach is not the most interactive. This program lends itself to questions of evaluation for students' own learning, as well as the learning and application of EMR work. Procedural stasis questions are not the focus of this model but do play a role in the next model. The questions associated with this curriculum tend to be fact/conjecture based, such as "How do EMRs work?", and procedural, such as "How do we manage the use of EMRs with patients and teach that to students?" This particular method of teaching EMRs to students is very specifically procedural in that it asks students to consider how EMRs are managed. However,

this program does not seem to evaluate how this procedural type of question, from a stasis theory point of view, misses how EMRs also have various effects on practice for both the physician and patient.

While Vanderbilt employs this approach to teach its undergraduate medical students about EMRs, this approach is not without its own difficulties. One common issue with EMR education in the first two years of school is how to connect it to other learning within the program. Silverman et al. (2014) found that utilizing new information in various contexts is hard for students and even more difficult for students who have a lecture-based experience with learning how to navigate EMRs and their importance. As such, the student may not physically see a variety of ways in which EMRs generate a range of different effects within the practices they are observing. It is also interesting to note that this stasis procedural type of question that this curriculum intends to tackle does not seem to translate beyond the theoretical into the actuality of practice for students. I say this because the ranges of EMR effects are missed within practice through this particular type of pedagogical approach. Vanderbilt responds to these critiques by continually evolving their curriculum to address what they perceive as challenges and/or flaws. This program at Vanderbilt also assess the education of students and how they respond to complexities, such as the one Silverman et al. (2014) points out in their work.

### **Real-World Experience**

This pedagogical approach to teaching EMRs focuses heavily on the realities of practice. While this approach can value both hands-on curricula and real-world scenarios, the goal of this teaching method is interested in exposing students to how EMRs will affect their practice. This method has taken two different approaches: having students work with big data from actual

patient EMRs and having students observe practitioners (preceptors) use EMRs in their daily work.

The first approach employs real data, or patient records, that serve as a precursor to the type(s) of work that students will engage in after medical school and residency. To be clear though, students are usually not allowed to enter this data into the systems themselves, and according to Friedman, Sainte, and Fallar (2012), this is for two primary reasons: 1) Billing for the practice is contingent upon work being sent from a certified physician; students not certified, and insurances will not pay practices based on a student's billing note (which is part of the EMR); and 2) Since these are students still learning about EMRs and their (the clinician's) role with EMRs, physicians do not want notes to be entered incorrectly or a note missed in a patient's record. In fact, Friedman, Sainte, and Fallar (2010) found that only about half of hospitals allow any students to insert information into EMRs while still in undergraduate medical school and residencies. It should be noted that this data was collected by education deans in the United States and Canada, so there is likely less than half that allow note insertion in the U.S. since the laws are stricter about medical education and EMRs. As such, this type of program asks students to consider questions of policy, such as "How do EMRs structure patient data and how do they include the identifiable information for correct billing in practice?", and definitional questions, such as "How are EMRs used in practice, and what does it mean to use them in practice?"

Big data within this context can serve as a way for students to consider why they are learning the things they are learning and how they can implement them in the future (policy). This approach also asks students to identify what is important within EMR work when they are engaged in their own practices and how the EMR can better serve them as a tool. Essentially,

questions of definition are at play with what the EMR is and how it can be employed. Rappleye (2015) discussed an example of this approach at the New York University School of Medicine (NYU-SM). More interactive than the Vanderbilt model because it situates students within real future work contexts, this approach starts teaching students about EMRs by employing big data. Big data is any group of information that is just that: big. While there's not a direct definitive number for big and little data, in medical research there is the idea that small data is not available for helping students understand EMRs because a bigger pool of data is more effective in generating various scenarios. For this school, big data means approximately "5 million de-identified patient records" (p. 5) that students interact with and analyze in order to measure a physician's performance. While working with these real-world records, students are encouraged to think about real-life situations for both the patient and the health care provider, and this notion is par for the course of what real-world experiences aim for when developing programs such as these. The goal of the program at NYU-SM is to immerse students in real-life situations and environments that they will literally work on when they are in their own practices. This program was so popular with students that the curriculum for this program changed in October 2014 to require every student to take "Healthcare by the Numbers" (p. 5). Since the patient records are real, students have a real opportunity to engage with meaningful work that they may someday encounter in their own practice. This program not only employs lectures but also asks students to conceptually consider concepts about EMR and their education. The EMR, then, becomes a tool for the students to utilize when creating and maintaining patient records. These tools facilitate what NYU-SM considers a "competency-based education" (p. 5). This means that students learn how to operate EMRs by interacting more frequently with them. In this program, this type of

pedagogical approach is to immerse students in situations that are real and have them identify that the EMR is a tool from which they can draw experience from when in real practice.

While this program is more interactive than the Curriculum 2.0 model, it is not without its own complexities and challenges. One particular problem that Peled, Sagher, Morrow, and Dobbie (2009) note is the actuality of time. While students are looking up diagnoses and learning about real patient records, they may be less inclined to do the work themselves if the need to look up information is not “imminent.” This can make it harder for students to learn real-world lessons. It should also be noted that these same authors claim that time itself can be a challenge as EMRs are always evolving while EMR education may be slow to keep up with these changes. In fact, Lown and Rodriguez (2012) note that teaching students how to use “21<sup>st</sup>-century extensions appropriately” (p. 392), such as time evolution, is imperative to successful EMR educative programs. NYU-SM attempts to address these flaws in their educative approaches by giving the students information in chunks in order to save time.

### **Hands-Off Real-World Experience**

There is a subsection of this type of program, and it is one that UCF COM utilizes through their COP work. This type of real-world experience does include examples of actual patient data and processes such as those mentioned above, but the main difference with this type of approach lies in the hands-off aspect. Instead of undergraduate medical students actually working with real patient data in various contexts (structured programs, different interfaces, etc.), students observe the ways in which EMRs are used in and around practice. While I will expand on UCF COM approaches later in this chapter, it is important to note that there is not only one real-world experience approach, and UCF COM follows a similar one, but instead of working

directly with patient data like those NYU-SM, these students follow a preceptor and see how the real-world experiences are situated. Instead of requiring students to engage in parts of the EMR process, this pedagogical approach asks students to consider their theoretical and conceptual training and watch it enacted in real practice. There are issues associated with this approach as well, and while I will delve into them later in this thesis, the main issue is that role modeling for these students could create a serious issue between students and preceptors if the preceptors are not modeling appropriate and conceptually difficult material that the student expects from their classes.

### **tEHR Programs**

Moving to an even more interactive model, the tEHR approach is an extension of the real-world experiences model as well as the Curriculum 2.0 model, as it allows students to practice real-world big data on their own servers, not associated with any hospitals, but there are also lectures given to students about EMRs and their roles within practice. tEHR is meant to engage students in how to operate within the parameters of real EMRs within real-world contexts. Lectures are meant to both reify the realities of EMR work and explain conceptual concepts, such as federal mandates, while the hands-on work with an EMR system is meant to better afford students a chance to apply what they have learned in lectures. These programs are developed within their own networks in order for students to work and practice with real patient data without the risk of messing up the data that is being submitted. These tEHR programs are also different from simulated EMRs (see the section below) in that these data points are already developed for students to work with, so the extra step of identifying and describing patient histories is not necessary. For this reason, this program is more interaction than the pedagogical

approaches thus far outlined, but not as interactive as the simulated EMRs programs I will discuss in the next section. Nonetheless, the tEHR program is one that asks students a series of stasis type questions. This program asks students to consider stasis points of policy, quality, and definition. Points of policy are encouraged by asking students what EMR systems do and do not work within different hospital settings. One such question the program asks utilizing a stasis type of policy is, “Should there some form of a streamlined policy in regards to billing and EMRs for medical students, patients, and physicians?” Questions of quality are encouraged for students to think about by noting that different hospitals and places that EMRs are used will inevitably consider various parts of the EMR system more important than the others. It is up to the students to determine which ones are the most important and consider their uses. An example of such a question is something along the lines of, “Is this policy better or worse than any alternatives or is there anything more or less honorable than the system currently in use?” Definitional questions exist for students as they attempt to understand the nexus of EMR specific terms, such as fluency, within their work and try to determine if their meaning of certain words are analogous to the places they are working. “What are the parts of fluency that I have learned about and how are they related in the work I have observed/am doing?” would be one such question. It should be noted that tEHRs are not common and were developed specifically for a particular school through the National Institute of Health’s grant programs as these types of programs are very expensive and require a large cash investment.

Rapplee (2015) found that the Indiana University School of Medicine (IU-SM) tends to focus on the hands-on actual “doing” of working with EMRs. This school attempted to address the EMR fluency educational quagmire by developing their own EMR version, which they call

the tEHR. The teaching EHR, or tEHR, employs both lectures and big data like the two programs aforementioned, but the main difference with this program is that they created their own EMR system that is not connected to any actual patient EMRs. Much like real-world experience data, this is an important component of this program as it allows students to actually *do* the writing of EMRs without their being any complications for patients. It should be noted, however, that there is some discussion among medical schools about the effective use of programs such as these, but this type of EMR education, Rappleye (2015) reports, does allow student to connect this training to the creation of patient data by juxtaposing lectures with EMR practice work. In this way, this program aims to effectively shape students' practices that are embedded in other hospital and clinical settings, but only to the extent I later specify. This system is meant to help shape the sharing of EMRs within the classroom by the theoretical (lectures) and the applied (hands-on) nature of this complex system. For example, students learn how to document and identify patient case histories in lecture and small groups outside of lectures. The goal is that students are able to understand how to access patients' histories, while exploring how those histories are applicable to the EMR work and education they are receiving. In fact, Pippitt, Stevenson, and Samuelson (2013) argue that all medical students should have access to EMRs and EMR programs in order to better learn and associate EMRs with real work in future practice. While they argue for actual programs for students to work within, federal restrictions and billing issues make this a difficult possibility for medical students. This program attempts to address this desire in the medical education field, and since this big data does not contain real patients to question about this data, proctors of the tEHR program are open to create myriad types of diagnostic situations with which students can engage. This is incorporated so student notes cannot cause damage to

anyone's real life, but it also limits the effect of using real patient data, since the patient histories are either not available or have been created by a curriculum developer. Students start participating with this program in their first year of medical school, and by second year, students receive 12 tEHR sessions learning about "systems-based practice and big data." According to Rappleye (2015), Module Directors aim to show students that the EMR is a tool to better understand medicine and interaction with patients, and they use the system to test students' understanding of their own learning. The pedagogical approach for this program makes it the second most interactive model I have come across in my research. Moving from this model brings us to the most interactive model when teaching students about EMRs: the sim-EHR.

One complexity associated with this model is that it doesn't give students practice adhering to HIPAA restrictions and considering how these will shape their practices. HIPAA restrictions are based in federal law and protect patients' privacy while, ideally, giving them more control over their own health. Mintz et al. (2009) point to this particular issue when they discuss their concerns about appropriate documentation. They argue that if students already have all of the de-identified information, then they do not necessarily need to think about the realities of how HIPAA and other factors may influence their work with patient records and compliance. Another challenge associated with this model is that EMRs are not streamlined from school to school or workplace to workplace, so learning a phantom ambiguous system may not be the most effective way to teach students about EMR work in practice. According to Hammoud et al. (2012), who surveyed clerkship directors nationwide, a major problem with programs such as these is realized in that EMRs are not streamlined and thus difficult to predict in real practice, thus making it difficult for directors to value what to teach in regards to EMRs. IU-SM addresses

these issues by trying to better incorporate policy and federally mandated notions of EMRs within their lectures. Next, they attempt to teach students the basic functions of EMR systems in the hopes that students will have a basic knowledge with which to transfer how to navigate EMRs in various contexts.

### **Sim-EHR Programs**

This type of program is designed to help students actively explore and think about real-world contexts within EMR application, demonstration, knowledge, and patient history. Typically, students engage in lectures with medical school professors as well as interact with various types of programs that are closely associated with EMR work in actual practice. In this way, this approach becomes the most interactive, and it asks students to not only work with EMRs but to start at the origin point: patient histories. This work is accomplished not only by simulating the EMR and documentation of visits but by taking a step back in the physician-patient interaction and asking students to ponder patient histories and how the EMR may or may not affect these particular interactions. This is a different type of procedural question than the tEHR asks, and patient histories are a large part of this reason. Starting from the beginning of clinical history allows students and clinicians to develop a real-world and cumulative curricular sense of what entering information about a patient may entail. Since this type of program requires these cognitive, as well as operational, standards from students, these types of programs tend to be more effective than the previously mentioned pedagogical styles, according to a study conducted by Gagnon et al. (2012). In their study, they found that technological and integrated applications should be necessary components of healthcare professionals, and this includes medical schools who are training future physicians. An aim of this type of program is to teach

students that EMRs affect “how trainees learn to care for patients in a variety of ways, from shifting workflows to altering opportunities for critical clinical thinking” (see Tierney et al., 2013). This program also asks students to focus on stasis questions of both policy and fact by thinking about HIPAA and how documentation is a necessary part of this process and evaluation of how physicians and patients’ interactions are affected by the EMR and the patients’ history. A question about policy that this program addresses is one such as, “Should some action be taken regarding required documentation, and how will proposed changes make things better or worse?” A question about fact revolves around students’ education, such as, “What is the cause of HIPAA, and required documentation and can it be changed?” Also, this program asks students to ponder what simulation means in how it asks where the simulation came from and what is its cause. A question along these lines may sound something like this, “How did simulation begin and is the simulation of patients and their records true?”

The Oregon Health & Science University (OHSU) provides an example of sim-EHR education. This information comes from a study conducted by Milano et al. (2014) and is intended to better explain what and how OHSU utilizes this particular model for their undergraduate medical students. Students also do not engage with real patient records, but ideally, students can use this program to better understand the EMR world since they are required to interact with the different interfaces of various programs that facilitate the procedures of how EMRs typically work. This is done by, first, simulating patients and asking students to better understand the diagnoses of these virtual patients. Having these virtual patients included is key because students can see first-hand how patterns of communication and other interactions may affect the patient/physician interaction. In addition to exploring this relationship, the virtual

patient is key to sim-EHRs because it allows students to start at patient histories and then work toward diagnoses and EMRs specifications. This program takes lectures, real-world experiences, big data, and the “doing” of working with EMRs and synthesizes them together so students can better learn how the complexities of EMRs operate physically and conceptually. Approaches such as sim-EHRs include lectures in order to promote critical thinking about patients and their particular histories, while allowing students to explore the concepts and theoretical underpinnings of what EMRs actually do for both patients and physicians. Next, real-world simulations are created based on both the teacher’s experience working with EMRs and the complications associated with them. Simulating the real-life experiences makes this program more accessible to students, while giving teachers the power to simultaneously change simulations to better fit the need of students’ learning. The big data is a part of this process but is modified by directors in order to achieve a more real-world experience than the patients’ records can provide by themselves. This program focuses on the “doing” and focuses on this by teaching students how the EMR operates, even if they work with different ones in varying contexts. This program was started in 2011 from an NIH grant for third year students. Students are given two weeks to work with simulated charts in small groups but are encouraged to work alone for the first week and bring any outlying issues to the group in the following weeks. The sim-EHR program at this school aims to introduce students to simulations that they will typically be associated with in practice. For this reason, this school theorized that this would be a successful and helpful program. OHSU assessed this program and found that sim-EHRs did help students better understand medical knowledge as required by the LCME (see Figure 1 for a list of these competencies). These students are not only learning about fluency of EMRs, but also about

patient interaction, medical knowledge, and procedure. In fact, this program was determined to be so helpful by the OSHU assessment that all third-year students are required to take it, and it

General objectives (ACGME competencies )	Specific objectives	Assessment measures
Demonstrates the ability to order prescriptions, laboratory tests, vaccines, imaging studies, and consultations (MK, PC)	Place orders for indicated medications based on the patient's medical issues	Orders for new medications are placed in the EHR based on evidence based-guidelines for each diagnosis.
	Place orders for indicated diagnostic, treatment, and preventive measures including consultations, laboratory tests, and imaging studies	Orders are correctly placed for evidence-based chronic disease surveillance, prevention, and management, including screening tests, vaccines, laboratory tests, diagnostic imaging, referrals/consultations, and needed counseling.

\* Related Accreditation Council for Graduate Medical Education (ACGME) competencies: P, professionalism; PC, patient care; SBP, systems-based practice; MK, medical knowledge; PBLI, practice-based learning and improvement.

**FIGURE 1: THE GENERAL EDUCATION REQUIREMENTS STUDENTS ARE REQUIRED TO MEET**

**Source: Created by author**

has become part of their grade for the class. By doing this, I find that this program is an extremely effective one in the way it asks students to learn and think about how EMRs are not only structured but how they can better evaluate them in their education and eventually in their own practice.

While this program is the most interactive and seems to be one of the better suited approaches, since it amalgamates various techniques to create a new one of its own, there are two particular challenges associated with it. The first challenge is that it is expensive to implement.

For example, the program at OHSU would not have been possible to implement financially if this school had not received a substantial grant from the National Institute of Health (NIH). This is an important constraint to consider as grants for this type of program are very competitive and funds are limited. Milano et al. (2014) mention so at the end of their article, and it seems to ring especially true for medical schools without the same opportunities for such grants. The next issue associated with this type of program is time. Time becomes a major challenge for this type of EMR education because medical students are very busy, and this program is very time consuming, especially given the many other curricular elements need to be covered in the relatively short amount of time associated with medical school education. While structured as part of their grade at OHSU, the amount of time it takes to develop this program and the amount of time it takes for students to participate in it are pertinent issues. For example, Silverman, Cohen, and Fridsma (2012) note that it takes a substantial amount of time to implement these types of curricula as they implemented one at the University of Arizona College of Medicine.

### **Relationship of Approaches to UCF Curriculum**

It is important for this chapter to situate how these above programs are relevant to the UCF medical education curriculum for students. As such, I will start with a brief review of the previous approaches, and then I will explain how UCF COM curriculum is constructed and comparatively implemented. The first approach noted above is a lecture-based approach, Curriculum 2.0. The common challenge associated with this pedagogical approach is that it's often hard for students to connect to new learning outside of lecture. The next approach is more interactive than Curriculum 2.0 and is concerned with the application of EMR education in real practice. This method, while mentioned above briefly in the real-world experience section, is

referred to as teaching EMRs through real-world experiences and faces a particular challenge of time, since students have all the information they need at their fingertips, while they may not have all of the information when they are in actual practice. I would like to reiterate that UCF COM does not promote a hands-on real-world experience pedagogical approach but a hands-off one in which students observe real patients and physicians during their COP work. Following this approach, the tEHR aims to teach students how to examine patients' history and then work within a confined and de-identified program of EMRs that helps students through lectures and operational measures to better understand EMRs and their impact on practice. Issues associated with this EHR method are that they may not teach students federally required mandates, such as how HIPAA plays a role in documentation, as well as utilizing only one version of EHR, while students may face a variety of interfaces because EMRs are not streamlined from hospital/practice to the next. The last approach discussed above is the sim-EHR, and as the most interactive program, it values lectures and real-world experiences, while creating a simulated educational experience where students begin with patient interaction and histories and build up to the real-world complications and documentations that EMRs require. The two main challenges that his program facilitates is that they are very expensive to implement, and they also require a lot of time from the directors who create them as well as the busy medical students who are expected to engage and interact with them.

A goal of the UCF COM program is to introduce students to working in environments they will eventually experience through a variety of pedagogical approaches, but mainly through lecture and simulation. In their interviews with me, the Module Directors who create the curriculum expressed very specific things they intended for students to learn and think about

through their education. For example, these directors try to keep students away from “templates and prepopulated notes” in order to “force them to think, because that’s the only way that really develop” skills they will need as a future physician. By lectures and simulated experiences with avatar patients and actual patient experiences that students will likely encounter, the Module Directors repeatedly mention that they intend on introducing students to real world concepts by promoting the notions that EMRs are tools and not their own inherent knowledge centers. They also admonish bad modeling for students during their shadowing and hope that they listen to patients and note their history. This is important to note as the UCF COM emphasizes just how much EMRs can affect doctor-patient communication and interaction. In fact, this program promotes procedural questions such as, “How do EMRs affect the contexts and varying elements of patient/physician communication?” Module Directors at UCF COM reiterate again and again that EMRs are “a tool” but “a reality.” In other words, Module Directors are also asking students to engage in the procedural question above by asking them to think about how the tools shape communicative practices and are a reality within practice. By approaching the curriculum this way, these Module Directors maintain that students will be more than capable of concentrating on patients, while simultaneously encouraging an efficient workflow, successful logistics, and appropriate responses to physician-patient and patient-physician interactions while noticing the makeup and change derived from EMRs. As such, this pedagogical approach is somewhat of a synthesis of the above approaches of the tEHR and Curriculum 2.0, but not of sim-EHRs or the use big data. For this reason, I chose the topic of teaching EMR fluency to medical students, as there is not a clear-cut way to approach how to teach fluency in any of the above models, and UCF COM is no exception. Particularly, the perceptions and expectations of students within this

field are what are the most interesting components of this medical program. These comparative programs are important to situate next to UCF COM's curriculum in order to identify the types of approaches and ways of thinking about EMR education for undergraduate medical students and compare (not evaluate) them to other programs.

The first two years of undergraduate education at UCF COM is typically spent observing, on a limited basis, with EMRs during the community of practice work that has been explained above. The main pedagogical approach in the first two years is for students to start to understand what EMRs are and how important they are in practice. To this end, EMRs are taught year by year with different subsections for each year. What this means is that under "Medical Informatics" in the Longitudinal Curricular Themes at UCF COM, different objectives such as "Demonstrate fluency with electronic health records systems" is spread over four years of education (UCF, 2017b). Each year a different objective is the key to teaching students about EMRs and how they operate. This is typically accomplished by the M1 and M2 Module Directors lecturing about them. Also, since students engage in their COP work in their first year, it sets students up to begin to understand what EMRs do and how they function in practice. In this program, according to the UCF COM website, "students are assigned to work with faculty preceptors throughout the Central Florida medical community. As role models, preceptors help students learn the clinical skills of patient communication and physical examination, and begin to develop the habits of inquiry and self-improvement..." (UCF, 2017b). The community of practice work is a program that allows first and second year students to shadow physicians in the area in order to begin to understand how EMRs operate and their importance in patient/physician interaction. Observing the work that these EMRs do, Module Directors at the UCF COM hope

that students will receive positive role models for how to incorporate EMRs into practice while simultaneously learning about them in lecture. The M3 and M4 years shift in their approach as they enroll in clerkships, in which they begin to see how EMRs are impacted more and more through the work of practice.

I would again like to note that the students for this study were not in their clerkships yet. The difference between clerkships and community of practice work is the level of interaction with the physician and patient. It should strongly be noted that students are still not engaged with the EMR directly for reasons listed above. Also, Module Directors teach students about writing in the EMR through a practice I called faux notes. These notes are meant to engage students in practicing to write a patient's health and physical notes in the EMR when they are in practice, but they are still not writing into the actual EMR. Clerkship students, do, however, begin to interact with avatar patients. While this is not the same as the sim-EHR programs listed above because patient histories are already created within avatar patients, students begin to get closer to interacting with conceptual notions of how EMRs may affect their future work. In this way, there is a learn, observe, and "do" model that the UCF COM seems to be incorporating into students' medical education, and this model is unique to UCF COM.

The most interesting thing about why these schools teach EMRs in various ways is that the different models show how important these schools are to the overall understanding of EMR education and medical education in general. Given the various constraints and challenges noted earlier, the main issues that have arisen in all of these pedagogical approaches is how the instructors/Module Directors aim to teach students the most effective way to engage with and learn about EMRs.

These ideas are especially important to the RHM in that there's a gap in knowledge for the medical profession, RHM, and medical education. By examining these issues and how different programs plan their EMR curriculum, scholars in these various fields can brainstorm and come up with an interdisciplinary answer for the complex problem of EMR education. These programs listed above all illustrate the ways in which EMRs are taught to students and are paramount to students so that they better understand the underpinnings and complexities of EMRs. An aim of all of the programs listed are to teach students skills and ways to learn how EMRs affect not only their practice but patients' welfare too. In this way, all of the programs attempt to help students better realize the use of EMRs in practice, while equipping them with a fluency of how to handle them. While these programs illustrate a broader idea of how these programs intersect and teach students EMRs various contexts, there are still some questions to be answered, such as how well UCF's curricular approaches align with program's goals, and how the program can determine whether the goals and approaches they have developed are working? One way to answer this is through another question that asks students about their perceptions and experiences with their education. We can ask about any gaps between program goals and student expectations, perceptions, and values, as well as these gaps matter. The next chapter will address these questions, how I researched these questions from the beginning, and how I carried out my research.

## CHAPTER THREE: METHODOLOGY

The purpose of this chapter is to explore the methods and approaches employed in this research study. Starting with the theoretical framework, this chapter's aim is to explain how I conducted this study and why, including my methods for data collection and data analysis. This chapter also aims to demonstrate how this research was conducted and how the data were analyzed.

### Theoretical Framework

The theoretical framework I employed in this study is stasis theory. This theory is grounded in classical rhetoric but has immense value in contemporary rhetorical analyses. In fact, in their book *Ancient Rhetorics for Contemporary Students*, Crowley and Hawhee (2012) adapt and revise the strategies of ancient rhetoric from Greek and Roman rhetoricians in order to reach a more contemporary audience. These authors use stasis theory, they contend, “as a heuristic—a means of discovery” (p.73). Following along this line of thought, this theory becomes a way to think about how arguments are framed rhetorically and what kinds of questions they raise. By helping identify the ways different positions or approaches might or might not be in stasis, or revolving around the same type of issue, this theory can be used to identify and understand where and how these approaches converge and diverge. In other words, utilizing this theory allows a rhetorician to make sense of some questions, ascertaining why questions were framed the way they were within an argument. This theory was developed in ancient Greece by Aristotle and Hermagoras. Much later, the stases were refined by Roman rhetoricians, such as Cicero, Quintilian, and Hermagoras as an invention tool. Working through the four stasis questions encourages knowledge building that is important for research, and the

formation of questions, according to Crowley and Hawhee (2012), can be applied to a variety of contexts in a variety of fields since the questions are about discovery. The four questions to this theory are split into categories and then further broken down into specific questions in order to conduct critical analysis of the line(s) of inquiry. One starts with broad question, and then continues to analyze questions until they are more specific and more revealing. These four types of questions are:

1. The facts (conjecture)
2. The meaning or nature of the issue (definition)
3. Evaluation of the issue (quality)
4. Actions for addressing the issue (procedure).

Applying these core tenets to lines of inquiry would, respectively, function similarly to the following questions: 1. It is true or only opinion? Did it happen? How did it begin? What's the cause; 2. How can the act or even be defined? What are its parts? How are they related; 3. What is the character of the act? Was it right or wrong? Is it better or worse than something else? Is it more or less important than something else; 4. What should we do about it? What actions are possible or desirable? How will proposed actions change the current state of affairs? How will proposed actions make things better for all involved?

In their seminal piece, Fahnestock and Secor (1988) analyzed how this theory can be utilized across different domains, and this is essential to me as I use this theory in the field of medical education, while my background is rooted in Writing and Rhetoric. Fahenstock and Secor (1988) found that stases, or points of why certain argumentative questions arise about a topic, are applicable to any field as a way to understand how arguments are framed and

generated. In addition to this information, Fahenstock and Secor (1988) also claimed that issues often revolve around multiple, related stases at once. These researchers found that more than one stasis point is usually associated with stasis questions. With this approach in mind, Graham and Herndl (2011) utilize Fahnestock and Secor's (1988) work to set the stage for stasis work within a more current scientific context. In their work, they analyzed the work of the MPG and found that stasis theory offered them "a rhetorical methodology that moves from an analysis of situated rhetorical practice to the regularity of discursive formations that can describe the possibility of change" (p. 148). This theory has helped me better analyze why and how the longitudinal curricular goals are constructed and enacted at the UCF College of Medicine, beyond what is written or said in other data collection methods. Stasis theory also helped me compare, as I will explain in more depth later, the differences between students' and Module Directors' ideas of undergraduate medical education. Taking note of Graham and Herndl's (2011) article, I used stasis theory to help guide how I answer my research questions and analyze my data. For the data analysis, I am employing this theory in order to find stasis points, or points of congruence and incongruence, between what Module Directors expect or hope the EMR education at UCF COM does and what students expect, experience, and perceive. As I analyzed data, I noticed patterns and used the stasis points to see how they relate to the research questions I am interested in.

### **Data Collection Methods**

The first step in planning some of my data collection methods and tools was completed in consultation with Dr. Scott in his special topics course and during his office hours. I also started this process by conducting informal conversations about the undergraduate medical school curriculum with the Module Directors at the UCF COM. This first step in planning the collection

of data was paramount to the plan for data collection and, eventually, for the data analysis that took place later. These meetings allowed me to better understand what I needed in order to collect the most relevant data and the best way to do so, since this project required both Writing and Rhetoric approaches and medical education approaches. The initial discussion with Dr. Scott and the Module Directors helped me better align this study in an interdisciplinary vein. The first data collection step I took was to receive IRB approval. After I obtained this in the summer of 2016, I then met with the Module Directors, Drs. Hernandez, Castiglioni, and Bellew, informally, to discuss how to approach collecting data from both students and themselves. During this meeting, the Module Directors noted that the most effective way to engage medical students in my work was to create an electronic survey, since they are familiar with the format and time requirements of electronic surveys. Next, utilizing the advice from the Module Directors, I developed tools for collecting data, namely an electronic survey, focus group interviews, and a review of Module Directors teaching materials, after which an interview was conducted about the teaching materials. In order to reach potential volunteers in this study, the Module Directors allowed me and my chair, Dr. Scott, to attend a monthly required meeting for students. At this meeting, I developed a small instructional sheet that I handed out to all M1 and M2 students (M3 students are later). I asked students to take the survey for their respective year on SurveyMonkey, and the sheet had a link to the survey.

During this required meeting, Dr. Bellew encouraged students to fill out the survey as part of their usual work. There were approximately 30 students at each of these required meetings. Dr. Scott and I were able to talk briefly about the study and ask for participants. While participants were not required to agree to take the survey, many students seemed interested in

participating. It is also at this meeting that I asked students to volunteer for focus groups with follow up questions about their education at UCF COM.

After I explained the study briefly and handed out the survey sheet, I explained to students that I would be in the conference room downstairs if students would like to participate in the focus groups. This is how I recruited all students for the focus groups. Similarly, the Module Directors allowed both Dr. Scott and me the same opportunity with the M3 students the following day. Similarly, I gave a brief synopsis of the study, Dr. Scott and I handed out survey sheets with the SurveyMonkey link on it, and then I asked some M3 students to stay after their meeting and meet me in the downstairs conference room in order to participate in the focus group. This is how all participants were recruited. It should be noted that I told all students that they could skip any question(s) they did not want to answer, and the Module Directors made it clear this was a voluntary project. I think it is important to list the questions on those surveys here so that I can explain my reasoning for the differences across cohorts and how these differences were reflected in the questions that were being asked.

### M1 Student Survey Questions

1. What are the most important things you know about electronic medical records (EMRs)?
2. How do you imagine EMRs affecting the work of physicians, including their interactions and communication with patients?
3. How important do you feel EMR education will be to this first year of medical school?
  - a. Very Important
  - b. Important
  - c. Moderately Important

- d. Slightly Important
  - e. Not Important
4. What do you want to learn about EMRs during your first year here?

### M2 Student Survey Questions

5. In your second year of medical school, what did you learn about EMRs that you found most valuable?
6. What are the most important things you learned about EMRs through the following (answer all that apply):
- a. The Community of Practice Shadowing?
  - b. Lectures from faculty?
  - c. Indirect discussions with peers and others?
  - d. Other
7. In your shadowing, how, if at all, did you notice EMRs affecting healthcare providers' interaction and communication with patients?
8. How do you imagine using EMRs in future practice, and how do you think this use will affect your work?
9. What do you want to further learn about EMRs in your second year?

### M3 Student Survey Questions

10. In your Community of Practice and clerkship work, what ways did you notice EMRs shaping the interaction between provider and patient?
11. What are the most important things you learned about EMRs through the following (answer all that apply):

- a. Ongoing Clerkship?
  - b. The Community of Practice Shadowing?
  - c. Lectures from faculty?
  - d. Indirect discussions with peers and others?
  - e. Other
12. In your shadowing and/or clerkship, how, if at all, have you noticed EMRs affecting healthcare providers' interaction and communication with patients?
13. The M-1 and M-2 years prepared me to understand EMRs and their uses in practice?
- a. Strongly Agree
  - b. Agree
  - c. Undecided
  - d. Disagree
  - e. Strongly Disagree
14. What do you want to further learn about EMRs in your third year?

These questions are important to list here, as the link to the survey is no longer available. That said, I should note the differences in the ways that these questions were structured and what they meant to uncover within this study. To begin, the M1 Student Survey Questions start by asking what students already know about EMRs and what they aim to learn from their first year in medical school. This is important to note as they have not yet completed a year at UCF COM, since they were only in school for a couple months at the time of this survey. I wanted to see what students expect to learn about EMRs in their first year. Next, questions 5-9 for M2 students aim at discovering something more suited to their year in medical school. As they have been

taught by Module Directors and faculty about EMRs, according to the Module Directors, the questions asked to them cannot be the same questions as M1 students. The questions for M2 students were aimed at trying to better understand their experiences of EMRs and how they may or may not have noticed EMRs shaping patient and physician communication. It should be noted that I did not have an objective in mind when I created these questions with Dr. Scott and the Module Directors; instead, I wanted to see what M2 students learned through the work they have done with EMRs. Lastly, questions 10-14 are not only aimed at understand the students' experiences with two years of EMR interaction and education, but they are also more in-depth and ask more of the M3 students than the previous two groups, because they should, in theory, have more to say about their experiences with EMRs and medical education. Also, a complete year of shadowing would have been completed for M3 students at the time of the survey, so a goal of mine was that these students would be able to point to specific instances and points of reference with EMRs and their education. I also wanted to see if any group mentioned the word fluency in their responses. The next section will discuss more about the surveys and that data collection.

The survey was only open for a total of two days because the Module Directors felt that after that time no other people would participate. After I passed out the aforementioned surveys, I checked SurveyMonkey to see if students were completing the surveys. I also only wanted the survey open for a short amount of time as I wanted to collect data and begin analyzing it. After two days, I received 76 completed surveys and determined I had enough data from surveys. The only one with access to the surveys is myself, but I will give permission to the Module Directors should they want the raw data. Two days of collecting surveys was enough as I also conducted

three focus interviews with M2 and M3 students, respectively, as well as the Module Directors. For these interviews, there were two students who participated from the M2 class and three who participated from the M3 class. I did not invite M1 students to participate in the focus groups because the questions therein were targeted at previous experiences with education; the Module Directors felt that M1 students may not have enough experience to accurately answer questions. As such, only M2 and M3 students were asked questions about their experiences in EMR education at UCF COM. These focus group interviews were conducted to illicit students' perceptions of their medical school education. Similar to the list of questions above in this chapter, I will list the questions here and explain why I chose to structure them the way I did. The focus interviews were conducted after each respective required meeting and lasted approximately 14 minutes for M2 students and 37 minutes for M3 students. All interviews were transcribed so that the data could be analyzed. Before I list the questions and explain their relevance, I should also note that all participants were asked to respond to only the questions that they were comfortable answering. They were not required, per IRB approval, to answer all or any questions, and I told them this before beginning the interviews.

#### M2 Focus Group Questions

1. What did you learn about EMRs during your first year of practice of medicine that you found most valuable?
2. What did you find most valuable about EMRs during your first year?
3. How do you think EMRs will impact your future work as physicians, including interactions and communications with your patients when you're in practice?
4. How do you think EMRs will impact your workflow?

5. How do you see electronic medical records kind of changing the way that you approach patient-centered care?
6. What questions about EMRs do you still have before entering your second year?
7. What do you want to learn and/or do with your EMRs in your second year?

### M3 Focus Group Questions

1. What did you learn about your EMRs during your first year or second year of practice of medicine that you found most valuable?
2. In your shadowing and/or clerkship, how, if at all, did you notice EMRs affecting healthcare providers' interaction and communication between the two?
3. How do you imagine EMRs impacting in future practice your workflow and approaches to patient care?
4. To what extent—in your opinion, of course—did M1 and M2 years prepare you in order to understand and interact with EMRs and their uses and practice?
5. What questions about the EMRs do you still have now that you're in your third year?

The purpose of the M2 focus group interview questions was to discover what students' experiences and perceptions were of their EMR training and how they saw others interacting with EMRs in practice. Since these students had a full year of training when this study was conducted, I wanted to make the questions were a little more to the point as they have experience with studies, but not as much as Module Directors and M3 students. For example, I included a lot of questions that started with “what” so that I could try and extrapolate an answer from students that kept our conversation going but on topic. I employed this idea because as I was talking with Dr. Scott and the Module Directors about the purposes of these questions, I hoped that more

experienced students and the Module Directors would talk more and around issues if I brought them up, so their questions are more open-ended. It does seem that this idea worked as the length of time of each of these interviews increases with the experience level of the students. I also tried to make sure that the questions were not evaluative of the Module Directors or the program at UCF COM. I intentionally asked qualified questions, such as the second question above during the M3 focus group interview, “In your shadowing and/or clerkship, how, if at all, did you notice EMRs affecting healthcare providers' interaction and communication between the two?” In this way, my aim was to collect as much data from these groups as possible, while attempting to not restrict their answers to only the questions I asked.

Lastly, I conducted a focus interview with all three Module Directors at UCF COM, after I had collected electronic survey data and conducted the focus groups with students. I wanted to interview the Module Directors to get a sense of what they aim to accomplish while teaching about EMRs and fluency. My aim for better understanding this concept is to better elucidate the differences and similarities in the data between Module Directors and students. This focus interview, as informed by teaching materials that was shared with me by the Module Directors, was at their leisure and the materials made available confidential. That information is privileged, meaning they asked me not to share it since it is ever evolving and created exclusively for the UCF COM and cannot be included in this thesis, but served as a solid point of reference for me when constructing questions about Module Directors’ experiences and expectations with EMR education. This interview was conducted in a conference room at the UCF COM and lasted approximately 24 minutes. I should be noted that Dr. Hernandez was interviewed separately, but unfortunately, her interview could not be recovered from the audio file. This interview was also

transcribed so that I could analyze the data and juxtapose the information from Module Directors and students. The questions I asked them are listed below, and I will explain why I structured them the way that I did.

#### Module Directors Focus Group Questions

1. What do you think are some pros and cons of students' experiences of learning about EMRs?
2. Including the community of practice work, what do you hope students will take away from the introduction and their interaction with EMRs?
3. Are there specific questions and/or challenges that you purposely address with students about their future work with EMRs?
4. Based on materials I've reviewed, do you mind telling me why you tend to introduce EMRs in the context of clinical narratives?

The main reason I framed the Module Directors questions the way I did is so they did not feel as though I was reviewing or judging their curriculum and/or the reasons they had behind creating the curriculum the way they did. I also wanted to see what they thought students valued within their education since I was interested in the fluency aspect of teaching and students' learning. A legitimate constraint when creating these questions was that the Module Directors told me they did not have a lot of time, so the questions I created and asked aimed to get at the curriculum meaning without taking too much of their time. After all, all of them hold M.D.s and run their own practices on top of creating undergraduate medical education. This is why I only asked them four questions, but I also told them to feel free to venture outside of the topic if there was

something they wanted to talk about. The interview lasted approximately 27 minutes, so I think that I received as much data and feedback as I could.

### **Data Analysis Methods**

Before I get into the specific stages of my analytic process with this data, I will overview the four primary stages I engaged in when analyzing data after collection. First, I identified initial themes and patterns in the survey data. I did this because it not only helped me become more familiar with the data I collected, it also allowed me to look at a chunk of data and gave me an eye toward the initial codes that seemed to emerge throughout focus interviews, which I knew I would get to later. The second stage of analysis I participated in was testing these initial codes out and adding to them in the focus group and interview data. To explicate what I mean here, I found that students, in survey data, were quick to point to particular themes over and over, and I wanted to see how these stacked against each other. The third stage of analysis was to develop three major codes that I could use to begin to recognize areas of discovery with which stasis theory aims to help. With that in mind, I chose to develop three overall codes, as the patterns and themes that I noticed seemed to fit within the three major codes: Expectations/Goals, Experiences, and Perceptions. I noticed that all other themes and patterns fit within these three overarching themes, so relating them back to stasis theory became the main reason I created and kept these coded categories. The last step in this process was to then identify key points of dissonance and congruence between not only Module Directors' goals and students' perceptions and values but also across the cohorts of students. I choose to make this move because stasis theory helps uncover these points and gets to the heart of what is going on with students' perceptions of their education, fluency, and EMRs. Throughout this process, I was refining

codes, visually mapping the relationships between this data, writing theoretical memos, and relating them to stasis theory. By identifying and illuminating these points of dissonance and congruence in the data, I hoped to find the different ways that students and Module Directors value and understand undergraduate medical education about EMRs.

### Initial Code Identification From Surveys

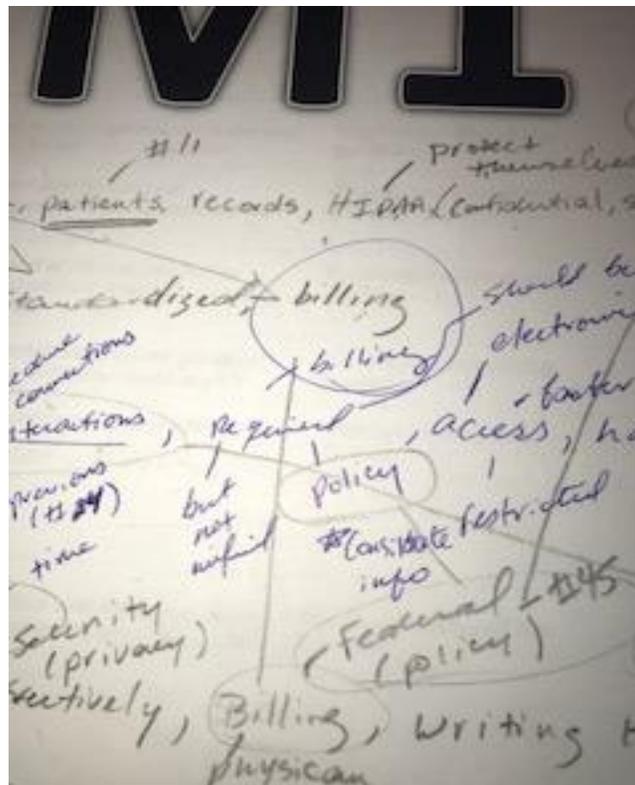


FIGURE 2: M1 INITIAL SURVEY CODES

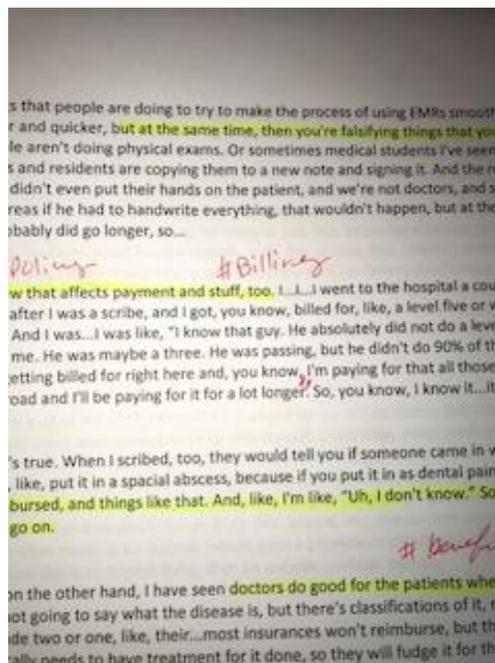
Source: Created by author

After I collected all the data from both students and Module Directors, I began to read through the data and note what themes and patterns seems to emerge from the data. I started with the M1 surveys for two reasons: 1) It was the largest data pool I had, so I thought that it would help to

get all of the patterns and codes that I could get out of them, since this was the largest group of data; and 2) It would help me begin to understand the experience of the students if I started with those who were just starting out on their medical educational journey. I did this by reading and re-reading the survey to better identify themes and patterns in student responses for each question. I was able to do this by first printing out the surveys I had collected and separating them by cohort (or respective year in medical school). As I read through the responses, I marked certain words and patterns that I saw emerging. This practice allowed me to write down main themes that occurred more than three or four times from M1, M2, M3 students. For example, see Figure 1. In this pertinent example, I wrote down words that kept appearing in the surveys even from question to question. Although this is only the M1 students' snippet, it demonstrates what I did to identify the initial codes. Figure 2 exemplifies that M1 students mentioned "billing" a lot, so I began to look for similar patterns throughout the rest of the surveys for M1, M2, and M3 students. The rest of the surveys' initial codes look similar to Figure 1 in their recursive patterns. Put another way, it was very clear that there were patterns emerging around logistics, billing, policy, age generation gap, and both positive and negative perceptions of their education throughout the year. By initially coded the surveys, it became apparent that I needed to compare this information to the focus interviews to better understand what codes were becoming more apparent, and this led me to the next stage in my data analysis.

## Testing Initial Codes Then Adding to Focus Group Interview Data

In this stage, I began repeating what I did in the first stage, but instead of surveys, I read and identified codes and patterns in the focus groups with M2 and M3 students and the Module Directors. In order to find where these points were similar, I marked them on the printed out transcripts of the focus interviews. As an illustration, Figure 3 is an example of one such pattern identification. This particular figure is of M3 students focus interview, but I repeated this type of



**FIGURE 3: VISUAL REPRESENTATION OF CODING FOCUS GROUP INTERVIEWS**

**Source: Created by author**

work for M2 students, M3 students, and Module Directors. It is interesting to note that since the only data I had from the Module Directors, other than some teaching notes, the amount of data from Module Directors is limited compared to that of the 76 student surveys or the handful of students who participated in focus interviews. After I wrote the patterns that I noticed in these

interviews, I went back to the surveys and started to compare some of the reasons why students and Module Directors seemed to be saying what it is they were saying. It is this point in the data that I started to notice some congruence points and some points of dissonance. Stasis theory states that by employing this theory, questions should start broad and then focus on these points that are found. An example of this that I noticed between the students and Module Directors is that both of these groups referred to the notion of age differences in EMR use within practical contexts. In terms of EMRs, this means that both groups of people noted that younger people should have an easier time navigating around EMRs than the older physicians that they shadow. Although this is not always the case, this generational age difference between physicians-in-training, newer physicians, and older physicians was a prominent theme that occurred across data sets. Interestingly, students also mentioned that there seemed to be a difference between older physicians and younger ones as compared to themselves. Since this theme occurred over multiple data sets, I created a code “generational age gap” whenever the age of working with EMRs became something students and/or Module Directors focused on. This coding system becomes important because there was a lot of data about this age gap, so it made me think about the differences and similarities not only between Module Directors but those between the different groups of students. It made me think about other codes and where they all fit, so I started to read survey data again and compare it to the focus interviews.

### Developing Three Overall Codes

During the third stage of data analysis, I started by noticing the places in data that were either similar or different from the second stage. In this stage, I began to notice a pattern of three master codes that all the other patterns fit within. As I began to work through all three groups of



FIGURE 4: INITIAL CODING DEVELOPING THREE MAJOR CODES

Source: Created by author

students and analyze data for the second time, I again noticed that the same three codes began to emerge and play a more dominant role in the data. For example, I noticed prominent patterns in the data about students’ perceptions of their education and Module Directors goals for the students. Module Directors wanted students to be able to see the EMR as a tool whereas students’ experiences and perceptions of EMRs are based in the federalized policy of EMR work in practice. I started this stage by creating a visual map of what themes were emerging. This map, in Figure 4, shows some interesting things that were necessary to my success in finding and figuring out what the data was saying. In this Figure, I started to align the codes and compare them with one another for recurring themes over all of the data I had. Whereas stage one was the surveys and stage two of data analysis was coding the interview data by looking back at the survey data, this stage takes those stages and goes a step further. I noticed that there were a lot of patterns that were emerging along three main codes. These three codes became the master codes that I used to organize all data within the surveys and transcripts. I started to notice that three main codes began to represent all the patterns that I found in the data. These codes are: Expectations/Goals, Experiences, Perceptions. The following chart is one that I used to better elucidate what I meant by three main codes and how I noticed them working in tandem with data to illustrate both different and similar values between students and Module Directors.

Name of Code	Working Definition	Example	Notes
Student Expectations	Similar to the Module Director Goals, these mean that the students expect what they want to learn whatever year they are in school. In other words, it’s the student version of Module Director Goals.	<b>I directly ask students what they want to learn in the upcoming years.</b>  “How to better use them, typical tabs to	These two codes are essentially the same except that students can’t create curriculum, so they can’t possibly call them

Name of Code	Working Definition	Example	Notes
		<p>check...”</p> <p>“How to use them effectively.”</p> <p>“What I want to learn...”</p>	<p>goals since they can only expect something. These mean the same thing in the code but not called the same.</p>
Experiences	<p>This definition is mainly for students because Module Directors are not the ones in school still learning. Students are the ones going through the programs, so while Module Directors say what they hope students get out of the curriculum, students are the ones who experience the curriculum. This can make a point of comparison.</p>	<p>MD- “...hope for a good role modeling of its use.”</p> <p>Students—taken from focus groups since they have experienced—“So taking a bunch of lessons on EMR that won’t be applicable to you I don’t think is helpful.”</p> <p>“I just feel like there’s a lot of redundancy.”</p>	<p>Coded for students because Module Directors did not talk about their experiences, but what they hope students experience.</p>
Perceptions	<p>This is again mainly for students as I started to realize that themes and patterns are similar for coding, but the reasons that either students and/or Module Directors say the things they say is what stasis theory will help me figure out. That said, perceptions are different than experiences because it’s what students are theorizing will or may happen as opposed to what happened.</p>	<p>“I believe EMR will be a commonplace tool in my practice of medicine, and I think it will be a useful tool more than a nuisance. I do not foresee its use affecting my ability to interact with my patients or being a distraction from them and their issues.”</p>	<p>Words and phrases like, “I’d like to learn...” are indications of expectation and phrases like, “I believe that...” are indicative of perceptions. I hope this makes sense.</p>

It is also during this stage of analysis that I began to see that Expectations/Goals are the same codes but slightly different in how they are approached. I differentiate between these because students expect, in the data that I analyzed, different things than Module Directors want them to learn. They both have goals in mind, but since the students are not the ones creating the curriculum, I don't think the same name should be used. That said, they mean the same thing in that both students and Module Directors have things they expect and goals they intend to achieve within their undergraduate medical school.

Next, I analyzed the data again and began to see where there were moments of congruence and moments of dissonance. The comparisons here are among Module Directors and students, as well as across cohorts of all the students. This is an important thing to note for this study could not have been successful without me comparing students as well as Module Directors to create three codes that all patterns seem to fit within (see the chart above for a visual representation. Most of the information I collected fit into one of these master codes, and so I began to identify relationships among themes and codes, including the stasis points they suggested. The more I noticed they emphasized similar or dissimilar issues, particularly the latter. This is important to this study because it illustrates how stasis theory can help analyze this data. These three master codes are related to stasis questions about the following:

1. Conjecture

- a. How are EMRs used in practice? What does this look like?

2. Definition

- a. How is fluency defined? How are EMRs defined as mere tools or shapers of interactions?

3. Quality

- a. What are they valuing as important or potentially good or bad regarding uses and effects of EMRs?

4. Policy

- a. What will they need to do, pay attention to, in using EMRs?

I linked and identified these types of questions by comparing what students said about certain themes and patterns that emerged juxtaposed to Module Directors' responses about the same topics. Next, I visually mapped out the relationship between the patterns in the text, as shown in

<i>Online module classes</i> <i>not at hospital don't work and are useless in practice are useless</i>	EMRs are a tool to help learn about EMR and learn about them on online modules	<i>Fact + quality</i>
Sometimes template increases speed for the workflow and makes documentation better but sometimes question how accurate the notes are	Interact appropriately with patients and EMRs and model bad behavior in COP and/or Clerkship	<i>policy, definition</i>
A lot of EMR work is useless because a lot is only driven by policy (such as legal reasons) <i>Doing?</i>	Develop EMR efficiency?	<i>How to do? Quality,</i>
EMR built by non-medical community and creates a big problem with them	Expose students to EMR and spectrum of uses	<i>policy,</i>
Scribes (M3 participants in focus group were) can save physicians time and knew about EMR before medical school <i>helpful</i>	Don't introduce students to EMR too early because not helpful for developing skills <i>scribes earlier</i>	<i>need info</i>
Need some uniformity between hospital they clerk at and where they learn systems (hard to get records for patients: reciprocity)	Develop skill sets to multitask with EMR like physicians do (not always bad modeling)	<i>Address quality</i>
All systems are different and a lot have templates and pre notes already set up in systems and used by people who work there	Develop skills by not having templates and prepopulated EMR exercises and systems	<i>quality</i>
Generation is digitally native so easier for them to use EMR	Introduce EMR and billing complexities	
Older physicians complain about EMR more and say slows them down	Address generational gap and use to advantage for digital natives	<i>agree on quality</i>

**FIGURE 5: COMPARATIVE CHART OF MODULE DIRECTORS' AND STUDENTS' DATA POINTS**

Source: Created by author

Figure 5 and the chart on pages 56 and 57. Mapping out how certain textual patterns were related to one another eventually showed me that there are themes under the master codes that also are interrelated. Noting this, I analyzed the data again to see what the patterns were saying about the interviews I conducted. I did this by taking the notes I made and highlights I created while reading through all the interviews, and juxtaposed what the question was asking students and how they responded. It should be noted that no other participant knew the questions for other participants not in their group.

### **Identifying Key Points of Dissonance and Congruence**

For the last stage of data analysis, I placed the themes under one of the master codes and started with making two types of comparisons. First, I compared the themes and patterns between the three student groups. I did this by utilizing what students in their respective years had to say and/or experienced in their time with EMRs and medical education. Secondly, I then compared the three student groups, individually, with that of the Module Directors. I found that this point of comparison is where most of the dissonance emerges. To better illustrate this trend, I created a chart (see Figure 4) that compared students and Module Directors' expectations, experiences, and goals of EMR education at UCF COM. Figure 4 included the eventual stasis points, as well as stasis questions, and the master codes that they were a part of. For example, a preliminary analysis of the group interviews of Module Directors found that a goal of theirs is that students take certain concepts away from lectures (such as not following a bad role model during the COP work), whereas students tend to think of these role models as not as effective for their future practice work. After thinking through and analyzing this data for the third time, I decided to create another visual that would shore up the information I was finding in a more

succinct way that would help me better see the results and indications for this study. The following chart was created to better incorporate all the elements of this methodology. As such, I created a list that illustrates both the dissonant and congruent points between Module Directors and students. I then placed stasis questions and points within the text where I found it in order to help delineate some of the data that I wanted to analyze. This list that follows is what really helped me figure out where these stasis points were appearing in the survey and interviews.

<b>Theme and Master Code</b>	<b>Students</b>	<b>Module Directors</b>	<b>Congruence or Dissonance</b>	<b>Stasis Question(s)</b>
1. Online Modules Codes— Experiences and Goals	Online module classes not used in hospital and useless in practice	EMRs are a tool to help learn about EMR, and students should be aware that they should have the skills not follow poor role models	Dissonance	Fact: Are online models used in the hospital? Quality: Are teaching online modules beneficial for student success in practice?
2. Federal and State Policy Codes— Experiences and Goals	A lot of EMR work is useless because a lot is only driven by policy (such as legal reasons)	Develop EMR efficiency within state and federal mandates	Dissonance	Definition: What is efficiency—in school or practice?  Policy: What should we teach about policy (Module Directors)?
3. EMR Use Codes— Perceptions and Goals	EMR built by non-medical community and creates a big problem with those in the medical community who	Expose students to EMR and spectrum of uses	Dissonance	Quality: Is exposing students to various types of EMRs successful?  Policy: How do we teach EMR navigation that's

<b>Theme and Master Code</b>	<b>Students</b>	<b>Module Directors</b>	<b>Congruence or Dissonance</b>	<b>Stasis Question(s)</b>
	has to interact with them			helpful?
4. Scribes- (Mainly M3 Students)  Codes— Experiences and Goals	Scribes (M3 participants in focus group) can save physicians time and knew about EMR before medical school	Don't introduce students to EMR too early because not helpful for developing skills	Dissonance	Fact: Are scribes exposed to EMRs earlier than non-scribes pre-medical school?  Policy: How will scribes make EMR education and using it practice better for students and physicians?  Quality: Should scribes be used in practice and taught in medical school or before?
5. Templates  Codes— Experiences and Goals	All systems are different and a lot have templates and pre-notes already set up in systems and used by people who work there	Develop skills by not having templates and prepopulated EMR exercises and systems	Dissonance	Definition: What, again, are "skills?"  Quality: Does it help students to not have templates if they're in practice?
6. Generational Age Gap  Codes— Experiences and	I. Older physicians complain about EMR more and say slows them down	Address generational gap and note the advantage for digital native students	Congruence	None

<b>Theme and Master Code</b>	<b>Students</b>	<b>Module Directors</b>	<b>Congruence or Dissonance</b>	<b>Stasis Question(s)</b>
Perceptions	<p>II. Need more young future doctors to think like they do and eliminate not thinking and only using templates</p> <p>III. Generation is digitally native so easier for students to use EMRs</p>			
7. Face to Face Communication  Codes— Perceptions, Goals, and Expectations	Best part of clerkship is the face to face communication not taught at UCF	Also develop face to face communication skills often lost by working with a computer	Dissonance	<p>Fact: Is face to face communication taught?</p> <p>Policy: What is desired to be taught about this type of communication?</p>
8. Community of Practice Work  Codes— Experiences and Goals	In COP work/Clerkship use EMR templates (Dr. does) and sometimes misses diagnoses	Think and retrieve own information without relying on EMR templates	Dissonance	<p>Quality: What is the character of the physician being followed/shadowed?</p> <p>Policy: Are they relying on templates every time?</p>
9. Patient Notes	Having to write notes is not helpful or	See communication and logistics of	Dissonance	Quality: Are writing patient notes better or worse than

<b>Theme and Master Code</b>	<b>Students</b>	<b>Module Directors</b>	<b>Congruence or Dissonance</b>	<b>Stasis Question(s)</b>
Codes— Expectations and Goals	realistic	EMRs		something else (like not writing them)?
10. Streamlined EMR Systems  Codes— Expectations, Goals, and Perceptions	Need some uniformity between the hospital they shadow at and where they learn systems (hard to get records for patients: reciprocity)	Need to develop skills in order to multitask with EMR like physicians do with congruent systems they work with	Congruence	None

It should also be noted that for this study, one element that I noticed in this last stage of analysis is that there is a trend in the data of what students *are not* saying in relation to the functions of EMRs and their relationships to patients. For example, a lot of data suggests that EMRs are recorded communicative tools shared between physicians (Pelletier, 2016), but ideally, they should also be shared with the patient in order for the patient to better understand and interact with his or her own medical choices and share them with their physician. Within this unspoken, yet inferred, data are also codes, but that is not the scope of this thesis. It should be noted and known but not focused on.

### **Preview of Next Chapter**

The next steps in my analysis were to try and better pinpoint where the dissonances led us as researchers and what these points mean for medical students and Module Directors at UCF COM. Continuing this analysis, I situated stasis theory deeper within these concepts and then applying them to the three master codes: Expectations, Perceptions, and Goals. By doing this, I

aimed to better understand how the education at UCF COM is experienced by students, as well as how it is perceived by students and Module Directors. Lastly, I also aimed to better understand how the goals of the Module Directors fit within the context of student experience. What I found, though, was that some of the goals of the Module Directors did not match that of the students' expectations of their medical education in regards to fluency and EMRs. The next chapter will discuss these findings in more detail.

## **CHAPTER FOUR: RESULTS OF DATA ANALYSIS BETWEEN COHORTS AND MODULE DIRECTORS**

This analysis chapter will answer three of the main research questions that were created at the beginning of this study. These questions are:

- How does the UCF College of Medicine's curriculum engage, rhetorically and otherwise, medical students toward developing fluency with EMRs across the first three years?
- How does interacting with EMRs in various degrees during medical school training shape students' perceptions of how to employ EMRs in a clinical setting, and what kinds of stasis questions do these perceptions relate to?
- What do students expect to learn about EMRs from UCF COM, and how do they anticipate EMRs can be used in their future practice?

This chapter will explore these questions and the analysis of data from this study, as well as how this analysis led me to arrive at key findings. The analysis will present key observations, examples, and explanations of what I found through data analysis. I should also note that not all of the data was analyzed in this study for two reasons: 1) not all data suggested patterns involving the codes I developed, and 2) the scope of this thesis and my key research questions did not call for an analysis of all the data I collected. As a reminder, three major codes were developed and employed to better analyze the data, and the chart below gives the reader a better idea of how I developed and executed this analysis. In the chart, the major code is listed as well as the following definition of the code, an example from the data, and any notes that I have associated with the code. This chart was instrumental in helping me analyze the data I collected

as it allowed me to better categorize and define what codes were important and their functions on this study.

Name of Code	Working Definition	Example	Notes
Module Director Goals	This code entails anything that the Module Directors mean for students to learn during their education either in or out of the classroom. These are a direct result of LCME accreditation benchmarks and Module Directors ideas of what is valued.	<p>“What I hope they take away from...”</p> <p>“Hopefully we can expose...”</p> <p>“The goal is to...”</p> <p>“So, we try to keep them away from templates and from prepopulated notes and force them to think, because that’s the only way that they really develop those skills.”</p>	Since Module Directors only have the interviews as their data pool, this is the only code that comes from both Module Director and student data.
Experiences	This definition is mainly for students because Module Directors are not the ones in school still learning. Students are the ones going through the programs so while Module Directors say what they hope students get out of the curriculum, students are the ones who experience the curriculum. This can make a point of comparison.	<p>MD- “...hope for a good role modeling of its use.”</p> <p>Students—taken from focus groups since they have experienced—“So taking a bunch of lessons on EMR that won’t be applicable to you I don’t think is helpful.”</p> <p>“I just feel like there’s a lot of redundancy.”</p>	Coded for students because Module Directors did not talk about their experiences, but what they hope students experience.

Name of Code	Working Definition	Example	Notes
Perceptions	This is again mainly for students as I started to realize that themes can be very similar and patterns are similar for coding, but the reasons that either students and/or Module Directors say the things they say is what stasis theory will help me figure out. That said, perceptions are different than experiences because it's what students are theorizing will or may happen as opposed to what happened.	"I believe EMR will be a commonplace tool in my practice of medicine, and I think it will be a useful tool more than a nuisance. I do not foresee its use affecting my ability to interact with my patients or being a distraction from them and their issues."	Words and phrases like, "I'd like to learn..." are indications of expectation and phrases like, "I believe that..." are indicative of perceptions. I hope this makes sense.

That said, I will start with the analysis of data from the three cohorts of students that I have previously mentioned, since these were as necessary to developing codes. Next, the results from the data analysis of the Module Directors and students will be presented in this study. I will present this data by grouping my findings around two major points of comparison—between student cohorts as they progress through pre-clerkship years, and then between Module Directors and the students' data that I analyzed, specifically goals versus perceptions and experiences. These include discovery of how the students' perceptions and experiences changed across the three cohorts and how these compared to the goals and values of the Module Directors around fluency with EMRs. Next, how the codes enacted analysis throughout this study will be discussed, as well as the various dissonant and congruent points among students and between students and Module Directors. Next, stasis theory will be utilized to better show these stasis

points are related to this study and the UCF COM. Lastly, an overview of this chapter and a purview of the following will be included.

### **First Major Comparison: Comparison Across Student Cohorts**

Before I begin with the students' data analysis, I would like to reiterate that all of these patterns were found by the data analysis methods mentioned in the previous chapter. I will group these students' data into themes, but remember that these patterns all fall under the main two major codes: Perception and Experience. I do not differentiate between the following themes and the major codes because all of these themes are under either perception and/or experience. It should also be noted that these themes are curricular and are by no means only restricted to the categories they have been assigned. I chose to group them in this way so as to demonstrate what I found through my analysis and make it easier to read. Those things said, I noticed that the main finding across the groups of cohorts was the way their perceptions shift over time, and these perceptions are informed by the experiences they have while in medical school. What this means is that repeatedly during data analysis, I noticed that M1 students often expected or perceived that they would learn something about EMRs, since they did not have the experience to compare to their perceptions. In contrast, M2 students, with some experience, noted things that shaped and changed through their experience with COP work. Moreover, M3 students gave in depth answers and noted that their experiences molded their perceptions. This is the main finding across this group of cohorts. That said, I will discuss specific examples of themes that emerged from the chart above and how the three groups of students approached the theme and the outcome of such. An especially important finding is that students' views shift over time based on their experiences. This is the case for every of the themes that have been mentioned above. I hold that

this is because they are applying what they have learned to actual practice and are noticing that everything is not always what the Module Directors hope their experiences are. The more experiences these students have, the more their perceptions of what is to come changes as well. I find this interesting because it reifies the idea that Module Directors can try and prepare students for this work, but it seems that students value what they learn both inside and outside of class, even if it is not what they expected it to be. Ultimately, students appreciate the curriculum Module Directors create but find that they learn the most by interacting with and working with EMRs. During analysis, I also found questions regarding what students are not saying about EMR implementation through their various stages of education. That is to say, students did not verbalize certain things about their perceptions and experiences directly but indirectly through open discourse with the surveys and focus group interviews.

For M1 students, what they expected to learn was not compared to what the Module Directors hope they understand, even though the Module Directors have it clearly spelled out in their materials they distribute to students. This is interesting because M1 students were clearly the ones who did not talk or give a much information, and it made me consider what they think of the Module Directors' expectations for them during their first year of medical school. Next, M2 students noted how interacting with EMRs in COP work shapes discursive value and experiences, and they did incorporate how these are reflected from their work but not their EMR education. This is interesting because how would the M2 students know how to interact with the EMRs in the first place, if not in their education from the Module Directors? I hold that, although they are not thinking about the impact the Module Directors' lessons had on them since my questions were related to their direct experience and perceptions, they did not actively think

about the educational attainment and direction given by the Module Directors. Not a single student blamed or had negative things to say about UCF COM. Criticism was reserved for the system and federal policies in place. Lastly, the M3 students did comment on how they anticipate to utilize what they have learned to help them in future practice. However, they mention that the system of learning about EMRs and fluency are not effective in current practice. Again, this is not an evaluation of UCF COM curriculum, as these students do not think that anything in their education could have been improved; it seems that M3 students find the system itself not effective in helping them. To this end, the next section will discuss the Module Directors' data and my analysis of that data.

### **Logistics and Usability**

The first main pattern that I found through my analysis in regards to logistics and usability is about online learning modules. To be clear, online learning modules are online learning trainings that teach students to navigate EMRs at the hospital they are working at, and also at UCF COM, and how to generally use EMRs. All students agreed that the online module classes in hospitals are not very effective when put into a real-world practice. What is interesting though is that three different groups of students agreed but for different reasons. For M1 students, they noted that hospitals using different systems seems ineffective to them. M2 students found that from their COP work, the online modules are only specific to one hospital and do not translate well in their anticipated practices after graduation. Lastly, M3 students felt that online modules at the hospital are useless but necessary for policy and billing, as these are defined by the federal government.

The next pattern deals with the templates that students have noticed either in their COP work or that they have learned about in classes. Students claim that sometimes templates increase the speed for workflow and makes documentation easier, but they sometimes question how accurate the notes are that have been logged into the EMRs. A template is sometimes used in practice, and it is pre-loaded notes and a diagnostic tool that allows for the user to quickly find a preemptive diagnosis for the patient. The physician then has to go over the populated notes with the patient for accuracy. It is interesting because there was a clear variance in how students perceived and experienced the templates, and it seemed to be based on the experience students had with these EMR systems.

Many M1 students, since they did not know every much about this particular topic, assumed that templates increase the workflow and policy apparatus (which is the why that things get filed and completed by the physician's office) for physicians in practice but also think that notes could potentially be flawed by using pre-determined templates to input patient information. Overall, though, they agreed that templates affect workflow and usability, but M1 students are not quite sure how because of their limited experience with mean. Moving along to M2 students, the view of these students shifts slightly from M1 students, as they thought that sometimes the templates could increase workflow efficiently and would make it easier for doctors to work with patients. Nevertheless, they also noted that sometimes the templates take away from the physician asking new and necessary questions about the patient's health. More along this line of thought, M3 students flat out questioned how accurate the templates are as one student noted that there were some errors in a patient's EMR that were the direct result of these preloaded templates. They also questioned template use for patient health and physical. In other words,

they questioned whether any preloaded system captured the patient's needs without asking them directly.

The next theme involves the EMR systems that students interact with not being built by medical professionals but by commercial communities and companies. All three groups of students noted this theme but had different ways of saying the same thing. M1 students were not entirely clear on what was meant by EMR systems being built per se, but they assumed that EMR structure and usability could be affected negatively or positively by those who create these systems. In their experience, M2 students claim that their experiences with EMR systems have been pleasant, but the classroom cannot possibly teach them about the EMR in use and practice. For this reason, they think that the medical community should help develop these systems. Taking this idea one step further, M3 students overwhelmingly see EMR education as not effective for them, but they make sure to note that this is not UCF COM's faulty; instead, they hold higher order issues, such as hospital EMR systems not being streamlined, as the real problem with EMR systems. This experience speaks to compatibility and transferability problems that are a result of the different systems that hospitals use. Again, it seems that students' experience dictates their future perceptions of medical education and practice in the real-world. For this theme, students start off thinking about the potential problems with EMR system design, then they collectively question the validity of teaching about them, since they are all different. Lastly, they hold that the issue is bigger than what the UCF COM can accomplish. I find this information very interesting because it sheds light on to the realities of how EMR systems affect logistics for doctors, but also for patients. Not one group mentioned that these systems could also negatively affect the patient's accessibility and usability for their own health

issues. All students focused on the logistics of themselves and the doctors they observed but not the patient's perspective.

The next theme regarding logistics and usability is that scribes may save physicians time in the room with patients, and many students knew about EMRs before starting medical school because they scribed or knew a scribe. Before I discuss this topic, I should make clear that there were not enough students in the M1 category to validate the idea that scribes can be more beneficial to physicians in practice, but it is an interesting thought for undergraduate medical education and the potential of scribes in practice. In fact, a couple of M1 students in this cohort were scribes before entering medical school and claimed that scribes can be helpful, while a lot of M2 students knew about scribing but had mixed feelings on how helpful they were because there is not a universal EMR system that would make scribes as effective as they can be. In contrast, many of the M3 students were scribes before entering medical school, and they hold that scribing for a physician was extremely helpful for them because it allowed for them to start learning how to navigate hospital EMR systems, even though they are not streamlined. Here, M3 students move the conversation to how the scribing helped them in medical school and did not talk as much about how the scribe can be helpful for the physician in practice.

The next theme, while similar to the previous theme about EMR system, differs in that it focuses on how the people who work within the hospital can help students better understand the EMR system. Since the EMR systems are different based on which hospital a student is at, there is usually a person or two people who work with these systems who can be helpful to UCF COM students. For example, M1 students claim that the people working in the hospitals will be more helpful to them than learning within the school setting, even though the majority of them have

not been working in a hospital yet. Many of these students heard from older cohorts that the people in the hospitals are helpful. Since M2 students have been working in these settings, they feel like this in-hospital help are useful but also have a problem with the people and EMR system. They claim that many of the people in these setting assume that students know how the operate and successfully navigate their specific hospital system. M2 students claim that these people assume students know more about the EMR systems than they do; this group of students would like help instead of being faced with assumptions about systems with which they are not familiar. Adding to this notion, M3 students say that the people who work in these systems are the most effective in helping them navigate EMR hospital systems but want the help for these systems to also come from the physicians they work with and not just hospital online modules and the couple of people who work directly with them. M3 students feel this way because they have moved from hospital to hospital over the past three years and experience first-hand how different all the systems are.

The last theme for logistics and usability is that there are little tricks taught in order to make navigating the different EMR systems more effective, but they are not taught at UCF COM because all of the systems are different. M1 students clearly expected to learn tricks to help them navigate the EMR system maze, and they expected to understand how to better understand how to learn the different EMR systems. Throughout the past year, M2 students found that templates and notes that are preloaded and built into the EMR system are the most effective way of modeling what they observe in the real-world practice, but they caution that these templates can be incorrect. With three years of experience, M3 students found that at every hospital they worked at, there were tricks that people who worked there taught them, but they did not learn

any of these tricks at UCF COM. These students think that learning some of these basic tricks across EMR systems, if they are any, is the best way to prepare them for working within the various contexts of EMR systems. Now, I will discuss the next theme for students' data.

### **Generational Age Gap**

The first theme that I noticed from the perception and experience main codes was a generational age gap theme that deals with younger physicians and, more specifically, the students at UCF COM. Many of these students at UCF COM are digital natives, meaning they have been around and have been operating computers and technological devices since they were children. In fact, M1 students claimed they would likely not have a difficult time navigating EMRs, since they are familiar with computers and other relevant electronic devices. M2 students commented on a difference they noticed between older physicians and younger ones. They hold that, in their experience, younger physicians did not seem to have as many issues with familiarity with EMR systems. To this observation, M3 students added that older physicians tended to focus on templates and easier one-touch tools, instead of focusing on the patient record as a whole.

Building on this, another age theme appeared and dealt with older physicians complaining about EMRs more frequently than younger physicians, and according to students at UCF COM, older physicians complain about the EMRs working too slowly. Since M1 students did not have direct experience with these issues, they perceived that EMRs would be more difficult for older physicians and easier for people around the students' own ages. Shifting to a slightly different point of view, M2 students felt that a lot of their experiences in their COP work could have been improved with more physicians paying attention to and teaching how the EMRs work in their practice. M2 students wanted the physicians to take a role in students learning

EMRs while in practice. Since the majority of the experiences of M3 students revolve around COP work before they enter their clerkships, these students felt as though there was a definite disparity between the work taught in school involving EMRs and the work they have been shown to do in COP work. While they did not offer a solution, M3 students were very clear about the disparity in learning and the work done in in their COP work.

The last theme addressing the age gap is on in which all students felt like future physicians need to think like students do when dealing with EMRs and eliminate only using templates for everything. M1 students claim that they think templates could be useful but are not sure about their uses in practice. M2 students noted that the people they followed in practice from the previous years did not apply a lot of what they learned in the previous year of school. In fact, M2 students said it seemed to them that the older physicians and students get the more they rely on templates and pre-loaded programs to approach EMRs. To this, M3 students added that they felt as though their last two years were not the most effective when learning about EMRs because this education depended on how old the doctor was that they shadowed in COP work. They mentioned this because they believe that the older physicians do not always use effective diagnostic procedures because they rely on templates and preloaded notes too much.

## **Education**

The next to last theme for the various cohorts at UCF COM is education. The first theme I found under the main codes of perception and experience is the idea that students found the UCF online modules to be the most helpful when learning about EMRs at UCF. Before I explain the different cohorts' data, I want to make it clear that this is not the same theme as the one under logistics. The previously discussed modules that the students did not find helpful were the online

modules that they had to complete at the hospital, whereas this module is the one given to them to learn about EMRs at UCF COM. However, the different online learning modules have the same goals: to teach either about EMRs generally (UCF COM) or to teach the user to navigate a specific system (hospitals). With that clarification, M1 students seemed to understand what they were expecting to learn about with these modules through their orientation and the EMR exercises in which they expected to participate. With a year of COP work and experience under their belt, M2 students said, when comparing their COP work to what they learned at UCF COM, they overwhelmingly preferred the UCF online model. They claim that the UCF COM module helped them better understand issues surrounding EMRs before they started their COP work. Although it was a couple years ago for M3 students, they still preferred the online modules at UCF COM as opposed to the classroom time learning about EMRS. This is primarily because they are so busy with coursework that their time was limited. They claim that UCF COM was the best experience for them.

The next theme around education is whether writing example notes, to practice EMR work before beginning COP work, is effective for students' education. All students that participated in this study found that writing the faux notes were not as effective for their COP work, but they had different reasons for this across cohorts. For M1 students, they expect to learn about notes and perceive that they will have to practice writing some type of EMR format, but they are hesitant about how effective they believe it will be. That said, they know that notes are paramount in the medical field, but they mainly focus on the logistics of the EMR. M2 students felt that writing faux notes did not help them as much as they would have liked because they felt that COP work exercised real-world experiences and writing the faux notes did not. Agreeing

with M2 students, M3 students did not find that practicing note writing was as helpful as they think it could have been, but they also do not think there is much that could have been done to alter the curriculum, as every place they completed COP work is, according to them, inherently different. Additionally, M3 students also pointed out that the efficacy and uniformity of faux notes is further complicated because there are other factors in play, such as hospital policy and a completely different system separate from UCF COM.

The last theme related to education for M1-M3 students is the notion that redundancy was not taught at UCF. Here, redundancy refers to students seeing EMR concepts they were taught in the classroom being repeated in practice. M1 students expect to learn about EMRs and want to be successfully prepared for working with EMRs. They think that what they learn about will be essentially what they see in practice. The majority of M2 students did see redundancy in practice, specifically in the ways in which templates were used in the first year of medical school and then in practice. Once again agreeing with the observations of the M2 students, M3 students added that many places they have been for COP work employ some of the same templates, which are used repeatedly. However, they note that in the various systems that are used across their work sites, all template systems were met with the same avail: templates were ultimately unsuccessful, as they did not increase efficiency of the patient and physician visit. Rather they made assumptions about the patients' needs and how to approach particular issues surrounding patient care.

### **Policy**

There are two themes that emerged from the main codes for policy. The first theme within policy for students is, they feel, that EMR work is useless because it is driven by policy,

such as legal reasons. All students agree with this statement but in different ways. For M1 students, they perceive that policy can get in the way of real issues at hand but do not have the experience yet to qualify their reservations about policy and EMRs. On the other hand, M2 students witnessed that billing was a major concern for them in their COP work because students cannot fill out and submit EMRs. If they do fill these out and submit them, payment will not be received, since the physician is not the one who submitted it, and this is one issue associated with students submitting EMRs. This group of students also mentioned that they felt there are concepts not taught at UCF COM, which they had to learn in doing the EMR work itself. This means that the nature of the EMR for this group of students had to be learned in practice in order to actually be the most effective. Taking this notion a step further, M3 students felt as though their education about EMRs was not useless, but they also think that the nature of the EMR cannot be effectively taught in school because it is too complex.

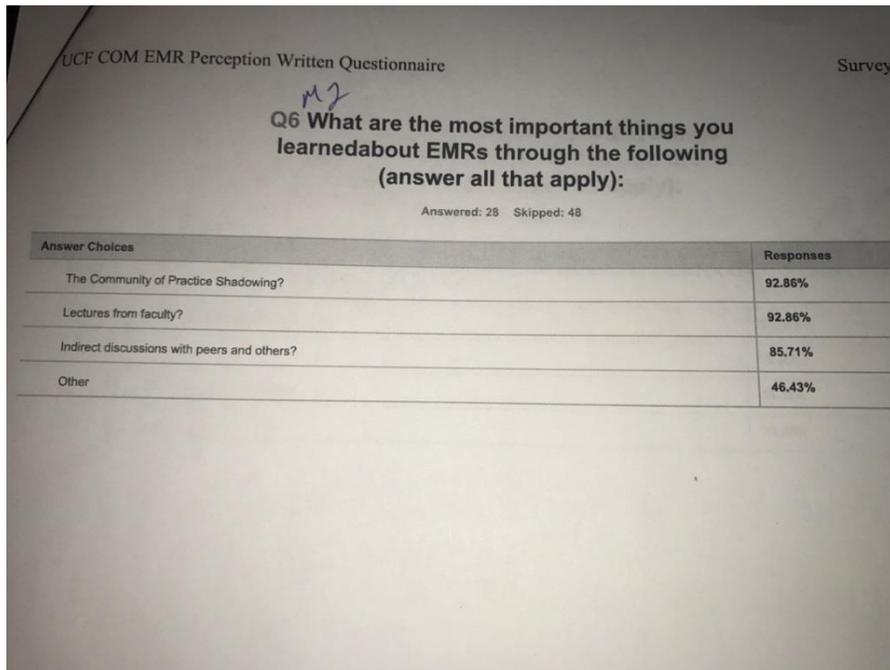
The last theme about policy is pretty straightforward, and it involves some type of uniformity between the hospitals students work at and the UCF COM when it comes to understanding what is valued within EMR education and practice. All students across the board agreed with this idea and even mentioned that it might not be possible to have this uniformity. Still, these students noticed a discrepancy between what the hospitals value in regards to EMRs and what the UCF COM valued teaching about EMRs. That said, students did not offer any solutions to this dilemma, so I do not know what they expect or want to change.

### **Second Major Comparison: Comparison Between Module Directors and Students**

A special note is required here, too, because all the information for this analysis is coded from all three main codes: Perceptions, Experiences, and Goals. This is the case as all of the

Module Director's goals and expectations were very clear and straightforward. As such, these themes are circular as well, and they are all under the main goal code. As such, seeing these codes will better delineate how the Module Directors expect their curriculum to be effective for UCF COM students. It is also important to say that one Module Director was absent from our focus group interview, so this data analysis is formed from the information from the other two Directors. The main findings about the differences between Module Directors and students involve the majority of time that students are exposed to learning and EMR fluency. This means that since the perceptions of students change over time, following their COP work, generally, they eventually do maintain that the goals of the Module Directors are effective ways to teach and learn about EMRs. I hold that it takes the actual practice with EMRs in work in order for students to fully understand what they have been taught by the Module Directors. Interestingly, the longer the student has been working with the EMRs in practice, the stronger their opinions are and the closer they come to realizing the Module Directors' teaching. The most important point that I found while conducting this analysis is that the Module Directors' goals (a main code) and the perceptions and experiences (the other main codes) create a stasis point of either congruence or dissonance. For example, students are concerned a lot with logistics, but to the Module Directors, logistics should be one of the last things that students are worried about. Thus, Module Directors are looking for how EMRs affect practice, and students, especially M1 students, are still looking at the EMR as a thing that affects time. The students and Module Directors here are both thinking about the EMRs and what the fluency of them means, but the dissonant stasis point revolves around procedural (policy) stasis questions. They are both wanting the same thing but have different ways of approaching them. I find that there are many

reasons for this dissonance and the same for similarities. I hold that these ideas change because the values and perceptions of students change over time and with more experience; in short, perceptions are shaped through theoretical learning and the physical practices that students engage in shape this learning and way of viewing EMR fluency. Utilizing the above information that I found during my analysis of this data, it is easy to delineate that students' perceptions and experiences are not entirely what the Module Directors hoped they would be. In the following paragraphs, I will list what I found as the most interesting of the themes presented above. Again, these themes are created out of the three master codes that I mention in the previous chapter: Perceptions, Experiences, and Goals. I will use stasis theory to better elucidate this information within this section of this thesis. I will list the theme, and then, I will discuss what I found as a result of my analysis and how stasis theory helped me to better understand the data I analyzed that is presented in this chapter. Overall, students found that their practice was informed by lectures at UCF COM, but working with the EMR systems were just as significant. The following chart (see Figure 6) shows that information and was taken from the survey I distributed to all students.



**FIGURE 6: WHAT ALL STUDENTS FELT TAUGHT THEM THE MOST ABOUT EMRS**

**Source: Created by author**

It is clear to see in the above table that 92.86% of students felt that both the lectures from the faculty and the COP work was the most important to their understanding of EMRs. Although vague, this chart is helpful, as it supports the point that students do not feel that the UCF COM Module Directors are not doing an appropriate job constructing the curriculum; instead, they seem to better understand the complexities of EMR systems and know that it is not the Module Directors who dictate EMR system information. Some students clearly see the value of learning about EMRs but focus on different reasons for learning about them such as less patient interaction. Regardless, both Module Directors and students explore the same issues and do not

think that the Module Directors can do any better than they are now. Following this paragraph, I will compare the students' and Module Directors' themes that are all from the three main codes: Goals, Perceptions, and Experiences. Following this, I will preview the next chapter.

### **Logistics and Usability**

The first theme the Module Directors explicitly state is that the EMR that they are teaching students is not a way of thinking about EMR work in general but a way for students to understand that the EMR is a tool for diagnosis and not as important as understanding the patient and the patient's needs, especially in collecting and documenting the patient's case history. They also explicitly state that they hope students do not follow poor examples, should they come across them in practice, as they know that not all physicians will be utilizing EMRs in the best modeling way. Module Directors want them to understand how EMRs can shape patient case histories. Thus, Module Directors hope that students will be better equipped to handle the "beast" of an EMR that is in the room with them.

The next theme for Module Directors is that they aim to teach students how to increase their efficiency, while still paying the most attention to the patient and what the patient needs. They attempt to do this by addressing issues of billing within their discussion of EMRs. The Module Directors noted that they understand how different and complex EMR issues can be in practice, and they also mention that they are not qualified to teach students absolutely everything about EMRs because they cannot possibly know the contexts and situations students will be in when they enter and complete COP work. Instead, Module Directors hope that students do not follow false ideas about how complex EMRs are and the processes that structure them. In this

way, Module Directors aim to teach students that thinking about the patient and the prognosis is the true, competent way to become a successful physician.

The students' perceptions and experiences dictate how they approach their workflow and the ideas of how this theme will inform their future practices. The Module Directors' aim is that students will be able to think about their practice without the shortsighted view of what EMRs do. This creates a stasis point of dissonance around policy. A question emerges from both the students and Module Directors along the lines of, "What should we do about the curriculum that we have learned here?" Stasis theory is helpful here as it points out this area of dissonance, and then, the Module Directors can specifically ask themselves, "What actions are possible or desirable in regards to the curriculum that we teach the students here at UCF COM?" Using this theoretical approach, Module Directors can then assess how the students feel their education is benefitting them and work to improve the educational value that students perceive.

### **Generational Age Gap**

Quite simply, Module Directors say that there is a generational age gap within COP work for students, but they do not really say what that means for the students within practice with an older physician, who may not be as savvy on a computer as the young, digital native medical student is. However, Module Directors also claim that since digital natives are very comfortable around computers and technology, they may not have the skills to effectively communicate face-to-face. They note this because of the algorithms that are built in to the preloaded templates and notes. They worry that students may see these tricks that older physicians tend to use and not realize that one of two things could be the case: 1) older physicians already know the material, since they have been practicing for a long time, and/or 2) these physicians may be using

templates in a negative way, which causes students to get the wrong impression of what should be done and how it should be done.

The Module Directors clearly point to the generational gap issue when they say that students might not have as much trouble with working with electronic systems because “of the whole generation gap issue because they’re used to have their computer screen in front of them all the time, so they maybe they’ll handle it better.” It is almost as if the Module Directors and the students are saying the same thing here or creating a point of congruence between the two groups. What is interesting here is that neither group have a solution for the generational age gap issues, but both of them point to it as though it needs to be addressed. What is more interesting is that Module Directors do not want students modeling bad behaviors from the COP work physicians but are willing to call the age differences an issue. For this reason, I can see a stasis point of quality at play. Module Directors and students may want to ask questions along the lines of, “Is the generational gap issue more or less important than something else that informs their EMR education?” To put this another way, both students and Module Directors can ask, “What is the character of the generational difference, and should the curriculum address this particular issue?”

## **Education**

This category within the three major codes is the best example of how stasis theory can help in other fields too. For example, with many of the themes in this paragraph, the construction of the points of dissonance and congruence, by both students and Module Directors, can be readily identified by pointing to the same issues, such as the benefits and limitations of EMRs in practice. Still, students and Module Directors have competing views of how to best teach EMR

fluency. This creates a point of dissonance with policy and the “how” to incorporate teaching EMRs to students. Both groups are valuing pedagogical ideas, but they have different ways of how they think they should be approached. Module Directors want students to know about EMRs before they enter into practice, while students value actually working with the EMRs as the best way to learn. That said, the Module Directors are very direct about a few themes that revolve around students’ education. The first theme is teaching students things that are appropriate for their level of engagement and learning in their year of medical school. What the Module Directors mean by this is that introducing concepts too early for students to grasp is ineffective and does not help students understand how to utilize EMRs in an effective and smart way. In fact, one Module Director said, “the concern about the students getting introduced to it [EMRs] too early is also my thought process of, you know, um, when they’re developmentally ready to do stuff.” Clearly, the Module Directors want to make sure that students can effectively and efficiently take away information from the lectures that can be applied easily in their COP work.

The next theme is one that the undergraduate medical students noticed, but the Module Directors have a different take on them: faux notes. The notes, for Module Directors, are a way to introduce students to pre-EMR work, since they do not wish to overwhelm newer medical students. These notes are the documents that will eventually be what students are writing for EMRs when they are in practice, but the Module Directors hold that students need to learn how to think about how they are used before they start writing in EMRs themselves.

The best example of a dissonant stasis point in the education theme revolving the three main codes is the notion of faux notes. In the second year, Module Directors have students write “a

total of five history physical write-ups, and” they “expect them to be two to three pages long because that’s the only way that they actually learn to properly document the history, the physician exam, and ... their thinking.” As mentioned above, the students find this note writing not effective for their future practices as they feel it is a means of getting work done for the classes but not something that will help them with COP work or their eventual practices. There was a main difference in how the two groups valued a particular pedagogical practice and their perceptions of its usefulness. Since this is the case, a dissonant stasis point of definition is created. Questions such as “What are the parts of this type of write up, and to what larger ideas with COP work do these belong to?” can be very helpful for both students and Module Directors when trying to figure out how to better construct the curriculum for the next cohorts.

## **Policy**

The most important stasis point happened at the level of policy. It is clear to see that students’ perceptions and their experiences are typically governed by the political and policy derivatives that hospitals employ because of federal policy but also because students and Module Directors are both wondering what is the best way to teach and learn about EMRs. The stasis question of policy works to help understand and define these underpinnings. This creates a congruent stasis point of policy. An applicable question to apply here would be: “What should we do about the level of regulation and federalization that inform our learning practices in our COP work?” This is an interesting idea because fluency is a part of this whole discussion, as it is regarded as a benchmark by the LCME, but there is not a guideline for how to effectively teach this concept. This is where the fluency aspect mentioned in Chapter 1 comes into play. As a reminder, according to Bayley, McLellan, and Petropoulos (2012) there are four levels of

performance with tools that help students succeed in practice, and EMRs are part of this practice. The third component, or tool, as they identify them as, is described as “Fluency – having a comfort level with incorporating the concepts into daily practice” (p. 1470). That said, the ways that students are comfortable with understanding EMR fluency is a main key for the success of how this is enacted for Module Directors. If students are not allowed to participate in the COP EMR work, then I wonder how it would lead students to becoming more fluent with EMRs based on this definition of use. In addition, students clearly indicate that they learn more and retain more information by doing the actual EMR work and not writing faux notes. To me, this means that the biggest problem here, like the students have said, is not with the UCF COM but with the federalized programs and hospitals that continue to regulate how students can and should be allowed to participate with EMRs.

For Module Directors, students may sometimes act as if they are hindering doctors when they are rounding in their COP work. This is an interesting theme about policy because it does not have as much to do with logistics as it does policy. The module directors note that students are not allowed to document EMRs for issues that students point to in their data: namely, billing purposes. So, if the student is worried about being in the way of the patient and provider, is the student focusing too much on the policy and political acumen of what is transpiring in the office, instead of paying close attention and learning as much as they can? This is a question posed by both Module Directors I interviewed, and I think it points to a very serious issue within the medical education community.

### **Preview of Next Chapter**

In the following chapter, I will discuss the implications of this research for the following: medical educators and the UCF COM and rhetoricians of health and medicine. Following this discussion, I will suggest where this research could be extended, and offer some concluding remarks about this study and this thesis project in general.

## **CHAPTER FIVE: CONCLUSION**

The overall purpose of this research study was to examine how the curriculum of the University of Central Florida's (UCF) undergraduate medical education program incorporates electronic medical records (EMRs) into students' undergraduate medical education. I studied student expectations, experiences, and perceptions and compared these to Module Directors' curricular goals. Mainly, I compared the experiences and perceptions of students' idea of learning about EMRs to that of the goals of Module Directors. When this project started, I was mainly focused on fluency and EMR practice, but as I analyzed data I realized there was more to this study than just fluency of EMR education. I will briefly recap the previous chapters, followed by the implications of this study, and potential areas of future research that this study made me think about.

### **Review of Previous Chapters**

Chapter 1 introduces the study's exigencies and research questions. Then it situates the study in relevant literature and research within medical education as well as the rhetoric of health and medicine. The chapter explains how this study hopes to better understand how medical students are introduced to electronic medical records (EMRs) in the first three years of medical school education (pre-clerkship), and how these first three years shape students' perceptions, values, and expectations about using EMRs, particularly related to physician-patient communication and interaction through the concept of fluency.

Chapter 2 explores the concepts of EMR education and the various approaches taken by various U.S. medical schools. As a reminder, some schools choose to employ sim-EHR (which stands for simulated electronic medical records), tEHR (which stands for teaching about

electronic medical records), big data, curriculum implementation, and community of practice shadowing. In these ways, the types of student interactions with EMRs vary, ranging from lectures to observations with actual data to use of simulated EMRs to real-world practice. The rest of Chapter 2 explored how these different programs introduce students to and teach them about EMRs, moving from the least interactive to the most. After discussing the major types of pedagogical approaches and specific examples of each, drawing heavily on Rappleye's (2015) work with EMR education, this chapter overviews EMR training across the first three years at the University of Central Florida; this training includes lectures about EMRs, training around patient histories, work with Community of Practice preceptors, online modules that teach students how to work with EMRs in practice, and faux notes, or notes designed to replicate the work students will eventually do in practice. To be more specific about the Community of Practice work, this is when students, starting in their first year, shadow and observe how physicians in practice manage EMRs in their practices; while they shadow, they are not allowed to actually write in the EMRs.

Chapter 3 explores the methods and approaches employed in this research study. Starting with the theoretical framework, this chapter explains how I conducted this study and why, including my methods for data collection and data analysis. Stasis theory was used to analyze the data. This chapter overviews the process I used to interpret and analyze the data that I had collected, and provides an in-depth look into how I developed codes and how the codes were used to better assist me in my analysis of this data.

Chapter 4 provides answers to three of the main research questions from the beginning of this study. These questions are:

- How does the UCF College of Medicine’s curriculum engage, rhetorically and otherwise, medical students toward developing fluency with EMRs across the first three years?
- How does interacting with EMRs in various degrees during medical school training shape students’ perceptions of how to employ EMRs in a clinical setting, and what kinds of stasis questions do these perceptions relate to?
- What do students expect to learn about EMRs from UCF COM, and how do they anticipate EMRs can be used in their future practice?

Chapter 4 presents key observations, examples, and explanations from my data analysis such as points of stasis congruence and dissonance between students’ and Module Directors’ ideas of appropriate EMR education. I want to again note that not all the data was analyzed in this study for two reasons: 1) not all data suggested patterns involving the codes I developed, and 2) the scope of this thesis and my key research questions did not call for an analysis of all the data I collected. Lastly, this chapter identifies points of stasis development between both Module Directors and students.

### **Review of Findings**

In this section I will review my findings from the previous chapter and their impact on this project. As a reminder, three major codes were developed and employed to better analyze the data. There were two major comparisons this study made and those are between the groups of cohorts, and the comparison between the Module Directors and the students as a whole. Next, I noted and utilized four patterns, or themes that emerged as a result of analysis. These minor codes are:

1. Logistics and Usability
2. Generational Age Gap
3. Education
4. Policy

All of these codes together, under the structure of the three main codes, elicited very interesting information about the UCF M.D. program curriculum and students' perceptions of them. As a reminder, the three main codes are: Perceptions, Experiences, and Goals. I found that there is a clear difference between student cohorts and students and Module Directors. Many of these differences are about how students and Module Directors, respectively, perceive undergraduate medical education. Whereas the Module Directors focused more on the goals of their classrooms, the students focused more on their perceptions of and expectations for experiences. For example, when discussing Logistics and Usability, students found that online training modules that teach students about EMRs were ineffective when they took them at the hospital they worked. However, the online modules were incredibly helpful to them at UCF COM as models of how to better navigate EMRs more generally. Module Directors, on the other hand, found that EMRs are only a tool that students employ when focusing on what is most important: understanding patients and their needs. The other themes within the three major codes also elucidated similar patterns between students themselves, and students compared to the Module Directors.

### **Implications of this Study**

Before I describe the implications elicited from this study, I will first discuss how my analysis and findings informed my implications, questions, and calls for future research. To begin, I will review the research questions that this study explicitly answered:

The analysis I conducted during this study informed these implications as I began to see how the different approaches from students and Module Directors began to reveal what they valued in terms of education and learning about EMRs. Students tended to focus on the logistics and tangible notions of what their education meant, while Module Directors tended to focus on the abstract and complex ideas of patient histories and their health. In analyzing some of these key trends, I began to see that there were things that students and the Module Directors were also not saying about undergraduate medical education such as how the EMR might affect not only the physician in medical practice, but also the patient and the patient's ideas of having autonomy over their own health. This analysis also led me to think about this study might affect the various stakeholders in UCF COM, RHM, and the broader medical system. After analyzing this data, the findings made it apparent to me that the values of students and Module Directors are what made this study important, including for the patients in the future students' practice. Also, it was interesting to see and note the things that students and Module Directors focused on such as getting the patient's health record and informing it, but not talking about themselves as patients.

Next, I will describe the implications for this study for two different yet equally important areas: 1) for medical education and practice, and 2) for the field of RHM. I will list them separately, but they are not exclusively separate. The UCF COM will be my primary example in the following section as this is where my research was conducted.

### **Medical Education and Practice**

This study is helpful for those within medical education and practice because there has not been a study within this field that explores the values and perceptions of students' and their ideas of EMR and EMR education. This study contributes to this field by allowing other Module

Directors and curriculum designers to recognize a broader view of what students are learning and seeing in practice in regards to EMRs. In addition, this study also shows that the UCF M.D. students generally appreciate the education they receive there, and think that EMRs are too complex to learn about solely in the classroom and other limited interactions over the first three years. The way that the curriculum is developed is guided by the Module Directors' goals for students, but sometimes those goals and the perceptions and experiences of students do not align. This creates an area of uncertainty for students; but as they mature throughout the medical program, they begin to better understand what the Module Directors goals for them were and they mostly agree although for different reasons. This research also has implications for EMR training at other medical schools who may be wondering how some students have perceived their curriculum and education at an undergraduate medical school. Also, the points of dissonance and congruence (e.g., around the use of faux notes) suggest that EMR education is a complex and complicated thing. This study suggests that in medical training, students' learning is often limited based on the nature of EMR systems and policy mandated uses of them. This means that no matter how the curriculum is constructed, it may be impossible to streamline education for students without streamlining some of the systems that students encounter in COP work. Although this is not an easy task to accomplish, this study suggests that the non-uniformity of EMR systems is a bigger issue both globally and locally. That said, the EMR training systems are very expensive, so how the UCF COM is able to effectively tackle this task is a question for another study. Overall, this study can be used by other undergraduate medical schools to show some of the areas in which students and Module Directors agree or disagree, and why and how those areas of congruence or dissonance are important to EMR education and fluency.

## **The Rhetoric of Health and Medicine**

This study is helpful for RHM for a number of reasons. First, this study is the first of its kind to rhetorically analyze student perception data within undergraduate medical school contexts. Before this study, no rhetorical studies that involve the students' perceptions as it pertains to EMRs and their education about them have been conducted. In particular, this study extends the work on medical education by Fountain (2014) and Rausch (2016) by allowing rhetoricians to look at undergraduate medical students and their specific interactions with EMRs throughout their undergraduate medical education. Specifically taking note of Rausch's (2016) work, this study extends her work by working with medical professionals and those located within the medical field such as she did with HIT and her work with eHealth platforms and nursing students. She was interested in how EMRs also affect the work of nurses and physicians. As such, this study is similar in that vein of trying to locate how EMRs affect patient and physician interactions in myriad ways. Next, this study adds to the growing interest in rhetorical theory as interdisciplinary. Taking note from Crowley and Hawhee (2012) and Graham and Herndl (2011), this study shows the utility of rhetorical stasis theory in health education contexts. That said, this study adds to Graham and Herndl (2011), and Fountain's (2014) studies that employ rhetoric in medical contexts in order to arrive at some type of rhetorical knowledge that is useful for both fields. There are also implications for how rhetoricians of health and medicine might study such training, especially through the lens of stasis theory. With stasis theory and stasis points, I expected a big difference between what the Module Directors said and what the students said, but I noticed that many times students and Module Directors arrived at the same stasis points and that differences in questions were more subtle or changed over time.

Specifically, I assumed that students would be more focused on stasis points such as fact and definition as they ask questions such as “what are these things?” and “how do they work?” I also assumed that Module Directors would focus primarily on stasis points of quality and procedure, but after completing my analysis, I can see that this is not the case, as I found a number of unexpected points of congruence. They arrived in different ways to these points and they asked different evaluative and procedural/policy questions. In this way, stasis theory is more complex and subtle than I had imagined, and suggests that fine-grained stasis analysis involves asking what is being presented and argued from stasis point A to stasis point B. In other words, this study also contributes to how stasis theory works within context, and that these studies are more complex than just points of misunderstanding. Other studies can use this idea to really explore stasis theory in more depth and complexity as it has shown in this study to be more complex than I initially thought. Also, other RHM scholars may use this study as a springboard for conducting more work within medical education.

### **Points of Potential Future Research**

It is interesting to see how students note perceptions of patient’s usability and access to their health. This makes me wonder whether another study could help better elucidate what patients are feeling about EMRs and their health within medical training and apprenticeship practice. Many studies focus on the EMR and the communication between physician and patient, but a study that analyzed the relationship between the patient and the medical student could be very interesting. To put this idea into a potential future research question, “What are students learning about patient rights and access to their health in theory and practice, and how do patients perceive the roles of EMRs in understanding and managing their health?”

Another study could compare pre- and post-clerkship perceptions and experiences. For example, one question could be, “How does the pre- and post-clerkship education change in value and scope over the years, and for what purposes?” This would be a study that engages perceptions of students’ ideas as well as those that create the curriculum. This study would be important as it could better expand how discourses change over time, and undergraduate medical education is not an exception. A study like this would also benefit specific programs such as pre- and post-clerkships at UCF COM. In this way, this study could be extrapolated to explore varying degrees of medical education and their rhetorical contexts.

My study also points to the need for more rhetorical studies of how fluency is defined and perceived in the context of medical education. By this, I mean that the definition of fluency is still not explicitly or consistently defined in medical education, so a study that looks at the elements of what constitutes fluency in medical education would be very interesting. This also makes me think about how the generational age gap could affect future practice for students that are younger and digital natives. For example, a study could focus on a question such as, “Does student familiarity and comfort enable them to use navigate EMRs, as a tool, more or less easily than those who are not digital natives?”

## **APPENDIX A: IRB APPROVAL FORM**



University of Central Florida Institutional Review Board  
Office of Research & Commercialization  
12201 Research Parkway, Suite 501  
Orlando, Florida 32826-3246  
Telephone: 407-823-2901 or 407-882-2276  
[www.research.ucf.edu/compliance/irb.html](http://www.research.ucf.edu/compliance/irb.html)

### Approval of Exempt Human Research

From: UCF Institutional Review Board #1  
FWA00000351, IRB00001138  
To: Justiss Dell Wilder  
Date: July 21, 2016

Dear Researcher:

On 07/21/2016, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review: Exempt Determination  
Project Title: The Communicative Value of EMR Education: Medical Students' Perceptions of Introductions to EMRs  
Investigator: Justiss Dell Wilder  
IRB Number: SBE-16-12387  
Funding Agency:  
Grant Title:  
Research ID: N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the [Investigator Manual](#).

On behalf of Sophia Dziegielewska, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 07/21/2016 05:53:13 PM EDT

IRB Manager

## **APPENDIX B: WRITTEN THEORETICAL MEMO**

### Expectations/Goals:

*Students:* For this code, I mean the expectations of the undergraduate medical students who are being taught about EMR fluency in the various stages of their education. I am interested in looking at how they expect to be taught about EMRs and what it means to be taught EMRs to the students. This code also includes what goals the students want from their education. The majority of the goals are coming from the surveys that I conducted online. The main difference that seems to be emerging between these two categories is that the goals tended to be more from the Module Directors than the students. In other words, the majority of students tended to focus on the expectations of what they “think” EMR fluency training will entail and how they intend to address it.

*Module Directors:* For Module Directors, they mainly talked about their goals for the students, as opposed to their expectations of them. A lot of these goals are ones that the Module Directors hope they are communicating clearly to the students. When this seems to match the expectations of students, a moment of congruence occurs; whereas, if the goals of the Module Directors and the expectations of the students are different, a point of dissonance is created. This information mainly came from the Focus Group with them, as well as their materials. For example, the Module Directors really expect students to understand the value of EMRs (as tools) much more than students understand their perceived values (as something that just needs to be done and can be copied from a template).

I have created a visual (TM 1) that represents what I mean by this trend, and I will make these as I continue. I think that these visuals will better help me illustrate where potential stasis points may occur.

### Perceptions

*M1 Students:* This code entails what students feel and find, through a survey I conducted. For these students, perceptions seemed to mainly fall along the line of what they expect to learn about in their first year of medical school. This group of students also tended to think of the EMR, not as a living document within their medical education, but something that they needed to check off in order to graduate into the next year. There is a lot of talk of policy, patients, and understanding of what physician and patient interaction should look at and how they should play out in the examination room. It should be noted that the perceptions of M1 students did strongly respond to their perception of technology literacy among older physicians. For example, M1 student #55 noted that EMRs “are also notorious for being difficult to use, though I think this has more to do with technological illiteracy among older healthcare workers and doctors.” Another first-year student, participant #35 claims that their “generation will have an easier time integrating EMR’s [sic] into practice.” When asked their perception of the importance of EMR

education in their first year, 26% of respondents felt this education to be “very important,” while another 26% of respondents found EMR education to be “important.” This is significant in that students seem to understand that the education is important, but they are not understanding why they are important for the care of the patient beyond privacy. Overwhelmingly, the policy that M1 students note in their perceptions of EMR and their education tend to revolve around privacy and federal guidelines instead of what the Module Directors hope for them to understand about the EMR education. Module Directors hope they find this education imperative in their need to better understand how EMRs shape interaction (i.e. interaction > policy)

*M2 Students:* These students tend to focus on their previous year as a first-year medical student, and then, they explore what they intend to find as a second-year student. Although issues of billing, policy, logistics, and efficient practice are the top common codes I found, there was one topic that students tended to write the most about. This question asked M2 students to envision using EMRs in future practice and how they might go about doing so. With this information, many students were divided in pros and cons of being legally required to utilize EMRs. One respondent eloquently summed up what multiple participants were saying. This student, #20, commented that in future work with EMRs, they “imagine that the work of documenting might become a separate job in itself from the physician.”<sup>1</sup> To reiterate this point, students noted that better technology, scribes, and various mobile devices with different operating systems may help alleviate the documenting job of physicians in the future. Another recurring code is that EMRs slow down the workflow and that future physicians need to come up with ways to navigate the EMR without losing too much time. Respondent #19 noted that the physician they shadowed “used post-it notes to jot down thoughts while in room [sic] and then recorded it in the computer later and shredded the note,” in order to save time. All-in-all, the perceptions of what EMRs will dictate was a very large and recurring code for this group of medical students. Logistics and regulatory policy pervaded the perceptions of students who took this survey to the point where patient privacy is actually rather lost as the focus of the EMR, and the substitute is this notion of what has to get done. It is interesting to note the differences in perceptions from the M1 students as M2 students tended to also focus on the future, but mainly focused on logistics and not so much on the medical school education. It’s as if the students were a lot more confident in their expectations of their own perceptions.

*M3 Students:* These students did not feel as though their education in medical school prepared them for the work with EMRs, but it should strongly be noted that a majority of this group of students found that there is no real preparation for working with EMRs other than doing

---

<sup>1</sup> This is interesting because the Module Directors did not allude to this during their interview, and it makes me think about the future potential of EMRs. What I mean by this is that EMRs have already come so far, I wonder what EMRs will look like in 20 years from now.

the work themselves<sup>2</sup>. In other words, these students, overwhelmingly, found their educations to be sufficient, but the complex nature of EMRs makes the education impossible to predate the work with them. For example, 83% of students indicated, via a SurveyMonkey survey, that they either “disagreed” or “strongly disagreed” that the M1 and M2 years helped prepare them to understand EMRs and their uses in practice. What’s interesting about this dynamic is that at the same time 83% of these students don’t feel that they were prepared for interactions with EMRs, 100% of respondents claimed that their “Ongoing Clerkship” work was the most important way for them to learn and understand EMRs while 33% noted they had “other” ways of learning and understanding EMRs. This discrepancy is interesting because it highlights the complex nature of EMR education and how third year medical students in this study indicated that their perceptions of EMR education were better served in the actual practice. It should also be noted that M3 students’ perceptions of how effective EMRs are for patients and physicians typically split along three ideas: not efficient, better care for patients, or ambivalent. An example from each of these categories will better illustrate this divisive nature<sup>3</sup>. Participant #60 commented that they feel as though EMRs “take away from their [physicians] interaction with the patient.” Conversely, respondent #72 notes in great detail how the records can be used in “outpatient general pediatrics where the physicians would use their EMR to track growth along a curve and show parents their child’s growth using the EMR.” Meanwhile, a lot of responses are similar to respondent #76 who claims that at times it is beneficial and not at other times.

### Experiences

For this code, I primarily draw from the M2, M3, and Module Directors interviews in order to better understand what experiences students have had while in medical school working and learning about EMRs, and what Module Directors experience as creators of the curriculum that these students are taking.

*Students:* There is definitely a difference in M2 and M3 students, and this makes sense, since M3 students have passed their first national board and are actively working with patients, but I didn’t find enough of a difference to separate the two groups into distinct codes. Instead, I think they work well together. I should also note that the majority of the information obtained from students during these interviews is primarily from the M3 students, which is appropriate as they have done more in three years than M2 students have in two. For a comparative idea, I have six pages of transcript from M2 students and eighteen from M3 students. I’m not quite sure why

---

<sup>2</sup> Look at M3 focus group when Student 3 says, “I think everything we’re saying [about EMRs] is that although we don’t feel that UCF did a ton to prepare us for EMR, we’re also not sure that there is much that they could have done to prepare us.” Student 1 agrees and says, “yeah, not sure what it would have been [about a better way to EMR train and educate]”.

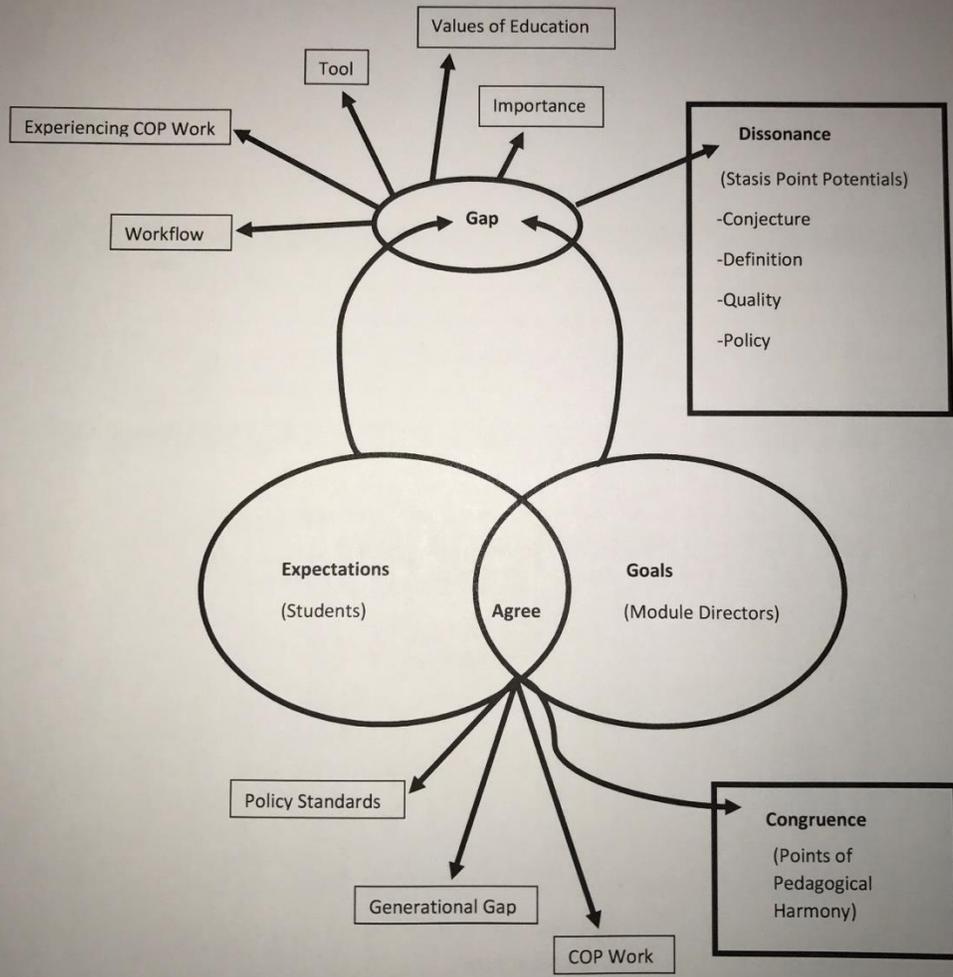
<sup>3</sup> It should also be noted that different students will have different experiences as they do not all shadow the same doctors and practices, so this data can only make assumptions based on this study.

the M2 students didn't talk as much, but they didn't. I digress. Both groups mention the generational age gap they perceive (M2 is more perception) and experienced (mainly M3 group). In fact, M2 Student 1 noted that "previous generations of doctors who might not have needed to use a computer until recently" may have a difficult time with complex EMR systems. Whereas M3 students in this focus group noted that their generation was "tech savvy" and the EMRs are still difficult for them to navigate from time to time. It is interesting that both groups talked about the generational gap and the consequences of EMRs being required and regulated by law. As aforementioned in the previous section, one very important area for a stasis point is when M3 Student 3 says, "I think everything we're saying [about EMRs] is that although we don't feel that UCF did a ton to prepare us for EMR, we're also not sure that there is much that they could have done to prepare us." M3 Student 1 agrees and says, "yeah, not sure what it would have been [about a better way to EMR train and educate]". This is very telling as the Module Directors intend to teach students about EMRs and how to effectively engage with them and the concepts they represent.

*Module Directors:* Module Directors look at their goals as ways that students will hopefully experience their education. They insist upon what students (they'll) "take away from" the various experiences and learning that these people have created for students. It's very clear to see where some stasis points fit in here, as the Module Directors cite the generational gap, but also how they hope their goals align with not only the perceptions of students but also the experiences. By comparing the focus group interviews, stasis points erupt between the pages<sup>4</sup>.

## **APPENDIX C: FIRST VISUAL MEMO**

Burry TM 1



## **APPENDIX D: COMPARATIVE CHART ABOUT EMRS**

<b>Students</b>	<b>Module Directors</b>
Online module classes in hospital don't work and are useless in practice	EMRs are a tool to help learn about EMR and learn about them on online modules
Sometimes template increases speed for the workflow and makes documentation better but sometimes question how accurate the notes are	Interact appropriately with patients and EMRs and model bad behavior in COP and/or Clerkship
A lot of EMR work is useless because a lot is only driven by policy (such as legal reasons)	Develop EMR efficiency
EMR built by non-medical community and creates a big problem with them	Expose students to EMR and spectrum of uses
Scribes (M3 participants in focus group were) can save physicians time and knew about EMR before medical school	Don't introduce students to EMR too early because not helpful for developing skills
Need some uniformity between hospital they clerk at and where they learn systems (hard to get records for patients: reciprocity)	Develop skill sets to multitask with EMR like physicians do (not always bad modeling)
All systems are different and a lot have templates and pre notes already set up in systems and used by people who work there	Develop skills by not having templates and prepopulated EMR exercises and systems
Generation is digitally native so easier for them to use EMR	Introduce EMR and billing complexities
Older physicians complain about EMR more and say slows them down	Address generational gap and use to advantage for new students

Best part of clerkship is face to face not taught at UCF	Also develop face to face communication skills often lost by working with a computer
In COP work/Clerkship use EMR templates (Dr does) and misses diagnosis	Think and retrieve own information without relying on EMR templates
EMR can help narrative and medicine meet (like classifications of diagnoses)	Understand clinical narrative and how to create them
Best learning was UCF online EMR Module	Understand workflow and EMR complexities associated with them
Having write notes not helpful or realistic	See communication and logistics of EMR
Takes more time and slows workflow	
Need to do the thing and only way to learn it is to do it	
Best is help on 1 <sup>st</sup> day of job with resident	
Learning little tricks that tend to offer a lot is best help for students	
Redundancy not taught about at UCF	

Need more young future doctors to think like they do and eliminate not thinking and only using templates	
--	--

## **APPENDIX E: UCF COM SURVEY QUESTIONS**

### M1 Student Survey Questions

1. What are the most important things you know about electronic medical records (EMRs)?
2. How do you imagine EMRs affecting the work of physicians, including their interactions and communication with patients?
3. How important do you feel EMR education will be to this first year of medical school?
  - a. Very Important
  - b. Important
  - c. Moderately Important
  - d. Slightly Important
  - e. Not Important
4. What do you want to learn about EMRs during your first year here?

### M2 Student Survey Questions

5. In your second year of medical school, what did you learn about EMRs that you found most valuable?
6. What are the most important things you learned about EMRs through the following (answer all that apply):
  - a. The Community of Practice Shadowing?
  - b. Lectures from faculty?
  - c. Indirect discussions with peers and others?
  - d. Other

7. In your shadowing, how, if at all, did you notice EMRs affecting healthcare providers' interaction and communication with patients?
8. How do you imagine using EMRs in future practice, and how do you think this use will affect your work?
9. What do you want to further learn about EMRs in your second year?

M3 Student Survey Questions

10. In your Community of Practice and clerkship work, what ways did you notice EMRs shaping the interaction between provider and patient?
11. What are the most important things you learned about EMRs through the following (answer all that apply):
  - a. Ongoing Clerkship?
  - b. The Community of Practice Shadowing?
  - c. Lectures from faculty?
  - d. Indirect discussions with peers and others?
  - e. Other
12. In your shadowing and/or clerkship, how, if at all, have you noticed EMRs affecting healthcare providers' interaction and communication with patients?
13. The M-1 and M-2 years prepared me to understand EMRs and their uses in practice?
  - a. Strongly Agree
  - b. Agree
  - c. Undecided
  - d. Disagree

e. Strongly Disagree

14. What do you want to further learn about EMRs in your third year?

**APPENDIX F: DATA REDUCTION CHART PHASE TWO M3 AND  
MODULE DIRECTORS**

<b>Students</b>	<b>Module Directors</b>
Online module classes in hospital don't work and are useless in practice	EMRs are a tool to help learn about EMR and learn about them on online modules
Sometimes template increases speed for the workflow and makes documentation better but sometimes question how accurate the notes are	Interact appropriately with patients and EMRs and model bad behavior in COP and/or Clerkship
A lot of EMR work is useless because a lot is only driven by policy (such as legal reasons)	Develop EMR efficiency
EMR built by non-medical community and creates a big problem with them	Expose students to EMR and spectrum of uses
Scribes (M3 participants in focus group were) can save physicians time and knew about EMR before medical school	Don't introduce students to EMR too early because not helpful for developing skills
Need some uniformity between hospital they clerk at and where they learn systems (hard to get records for patients: reciprocity)	Develop skill sets to multitask with EMR like physicians do (not always bad modeling)
All systems are different and a lot have templates and pre notes already set up in systems and used by people who work there	Develop skills by not having templates and prepopulated EMR exercises and systems
Generation is digitally native so easier for them to use EMR	Introduce EMR and billing complexities
Older physicians complain about EMR more and say slows them down	Address generational gap and use to advantage for digital natives

Best part of clerkship is face to face not taught at UCF	Also develop face to face communication skills often lost by working with a computer
In COP work/Clerkship use EMR templates (Dr does) and misses diagnosis	Think and retrieve own information without relying on EMR templates
EMR can help narrative and medicine meet (like classifications of diagnoses)	Understand clinical narrative and how to create them
Best learning was UCF online EMR Module	Understand workflow and EMR complexities associated with them
Having write notes not helpful or realistic	See communication and logistics of EMR
Takes more time and slows workflow	
Need to do the thing and only way to learn it is to do it	
Best is help on 1 <sup>st</sup> day of job with resident	
Learning little tricks that tend to offer a lot is best help for students	
Redundancy not taught about at UCF	

Need more young future doctors to think like they do and eliminate not thinking and only using templates	
--	--

## **APPENDIX G: FOCUS GROUP QUESTIONS**

Module Directors:

- What are some ways that students are introduced to EMRs directly and indirectly?
- Why do you choose to introduce the EMRs in this way, and what are some of the pros and cons that you encounter while constructing this curriculum?
- Including the Community of Practice work, how do you envision/aim that students take away from your introduction and interaction with EMRs?
- Are there specific challenges that you purposefully address with students about their future work with EMRs?

M-1:

- What do you know about EMRs, and how do you expect to learn about EMRs during your first year here?
- How important do you feel EMR education will be to this first year of medical school?
- What are your perceptions of how EMRs are used within practice, and have you heard about the Community of Practice approach yet?
- If you haven't shadowed any doctors during your medical school training yet, how do you imagine EMRs affecting the work of physicians?

M-2:

- What did you learn about EMRs during your first year of Practice of Medicine that you found most valuable?
- What did you learn about EMRs through:
  - Community of Practice Shadowing?
  - Lectures from faculty?
  - Indirect discussions with peers and others?
- How do you imagine you will use them in future practice?
- How do you think EMRs will impact your future work with physicians?
- How did you notice EMRs shaping the communication and interaction with patients?
- What questions about EMRs do you still have before entering into your clerkship? What do you wish to learn/do about EMRs in your clerkship?
- Was there anything about EMRs that you wish you knew before completing the M-2 year?

M-3:

- Now that you have taken the Step 1 Exam and are three months in to your third years:
  - To what extent and how did the M-1 and M-2 years help prepare you to interact with and understand EMRs?
  - Is there anything you wish you had learned in the previous two years about EMRs during your Community of Practice?

- Is there anything you wish you had learned in the previous two years about EMRs before starting your clerkship?
- In your opinion, how could you have learned about and prepared to interact with EMRs before the M-3 year?
- In what ways did you see EHRs shaping the provider-patient and patient-provider interactions?
  - What are some communication dynamics with patients that you noticed between the provider and patient?
- In your Community of Practice and clerkship work, what ways did you notice EMRs shaping the interaction between provider and patient?

## REFERENCES

- AAMC. (2017). *Liaison Committee on Medical Education*. Retrieved from [http://https://www.aamc.org/members/osr/committees/48814/reports\\_lcme.html](http://https://www.aamc.org/members/osr/committees/48814/reports_lcme.html)
- Bayley, L., McLellan, A., & Petropoulos, J. (2012). Fluency--competency or expertise--is needed to incorporate evidence into practice. *Academic Medicine*, *87*(11). doi:10.1097/ACM.0b013e31826d5962
- Crowley, S., & Hawhee, D. (2012). *Ancient rhetoric for contemporary students* (5th ed.). New York, NY: Pearson.
- Fahnestock, J. & Secor, M. (1988). The stases in scientific and literary argument. *Written Communication*, *5*(427). doi:10.1177/0741088388005004002
- Fountain, T. K. (2014). *Rhetoric in the flesh: Trained vision, technical expertise, and the gross anatomy lab*. New York, NY: Taylor & Francis.
- Friedman, E., Sainte, M., & Fallar, R. (2010). Taking note of the perceived value and impact of medical student chart documentation on education and patient care. *Academic Medicine* *85*(9). doi:10.1097/AMC.0b013e3181eac1e0
- Gagon, M., Desmartis, M., Labrecque, M., Car, J., Pagliari, C., Pluye, P., . . . Legare, F. (2012). Systematic review of factors influencing the adoption of information and communication technologies by healthcare professionals. *Journal of Medical Systems* *36*. doi:10.1007/s10916-010-9473-4

- Graham, S. S., & Herndl, C. G. (2011). Talking off-label: The role of *stasis* in transforming the discursive formation of pain science. *Rhetoric Society Quarterly*, 41(2).  
doi:10.1080/02773945.2011.553764
- Hammoud, M. M., Margo, K., Christner, J. G., Fisher, J., Fischer, S. H., & Pangaro, L. N. (2012). Opportunities and challenges in integrating electronic health records into undergraduate medical education: A national survey of clerkship directors. *Teaching and Learning in Medicine* 24(3). doi:10.1080/10401334.2012.692267
- Internal Revenue Service (2015). The american recovery and reinvestment act of 2009: Information center. Retrieved from <https://www.irs.gov/uac/The-American-Recovery-and-Reinvestment-Act-of-2009:-Information-Center>
- Lown, B. A., & Rodriguez, D. (2012). Lost in translation? How electronic health records structure communication, relationships, and meaning. *Academic Medicine* 87.  
doi:10.1097/ACM.0b013e318248e5ae
- Marcum, J. W. (2002). Rethinking information literacy. *Library Quarterly* 72(1). Retrieved from <https://eric.ed.gov/?q=EJ641623&id=EJ641623>
- Meloncon, L. & Frost, E.A. (2015). Charting an emerging field: The rhetorics of health and medicine and its importance in communication design. *Communication Design Quarterly* 3(4). doi: 10.1145/2826972.2826973
- Milano, C. E., Hardman, J. A., Plesiu, A., Rdesinski, R. E., & Biagioli, F. E. (2014). Simulated electronic health record (Sim-EHR) curriculum: Teaching EHR skills and use of the EHR for disease management and prevention. *Academic Medicine* 89(3).  
doi:10.1097/ACM.000000000000149

- Mintz, M., Narvarte, H. J., O'Brien, K. E., Papp, K. K., Thomas, M., & Durning, S. J. (2009). Use of electronic medical records by physicians and students in academic internal medicine settings. *Academic Medicine* 84(12). doi:10.1097/ACM.0b013e3181bf9d45
- Morrow, J. B., Dobbie, A. E., Jenkins, C., Long, R., Mihalic, A., & Wagner, J. (2009). First-year medical students can demonstrate EHR-specific communication skills: A control-group study. *Family Medicine*. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/19132569>
- Nickitas, D. M., Nokes, K. M., Caroselli, C., Mahon, P. Y., Colucci, D. E., & Lester, R. D. (2010). Increasing nursing student communication skills through electronic health record system documentation. *Computers, Informatics Nursing*. doi:10.1097/01.NCN.0000336491.11726.4e.
- Peled, J. U., Sagher, O., Morrow, J. B., & Dobbie, A. E. (2009). Do electronic health records help or hinder medical education. *PLoS Med*, 6(5). doi:10.1371/journal.pmed.1000069
- Pelletier, S. G. (2016). Teaching medical students to integrate electronic medical records into patient-centered care. *Association of American Medical Colleges*. Retrieved from <https://www.aamc.org/newsroom/reporter/februarymarch2016/456238/electronic-medical-records.html>
- Pippitt, K., Stevenson, A., & Samuelson, W. (2013). Medical student education in the EMR era requires access to the EMR. *Academic Medicine* 88(12). doi:10.1097/ACM.0000000000000013
- Rappleye, E. (2015). EHRs, big data take medical curriculum to school. *Becker's Health & CIO Review*. Retrieved from <http://www.beckershospitalreview.com/healthcare-information-technology/ehrs-big-data-take-medical-curriculum-to-school.html>

- Rauch, S. (2016). *Rhetoric and economics of user attention in the documentation of EHR-generated clinical narratives* (Doctoral dissertation). Retrieved from Texas Tech's Digital Thesis and Dissertation Service. (2016)
- Scott, B., Segal, J. Z., & Keranen, L. (2013). The rhetorics of health and medicine: Inventional possibilities for scholarship and engaged practice. *Poroi: An Interdisciplinary Journal of Rhetorical Analysis and Invention* 9(1). doi:10.13008/2151.2957.1157
- Segal, J. Z. (2005). *Health and the rhetoric of medicine*. Carbondale, IL: Southern Illinois UP.
- Silverman, H., Cohen, T., & Fridsma, D. (2012). The evolution of a novel biomedical informatic curriculum for medical students. *Academic Medicine* 87(1). doi:10.1097/ACM.0b013e31823a599e
- Silverman, H., Ho, Y., Kaib, S., Ellis, W. D., Moffitt, M. P., Chen, Q., . . . Gadd, C. S. (2014). A novel approach to supporting relationship-centered care through electronic health record ergonomic training in preclerkship medical education. *Academic Medicine*, 89(9). doi:10.1097/ACM.0000000000000297
- Tierney, M. J., Pageler, N. M., Kahana, M., Pantaleoni, J. L., & Longhurst, C. A. (2013). Medical education in the electronic medical record (EMR) era: benefits, challenges, and future directions. *Academic Medicine* 88(6). doi:10.1097/ACM.0b013e3182905ceb
- University of Central Florida College of Medicine. (2017a). *Longitudinal Curricular Themes*. Retrieved from <https://med.ucf.edu/academics/md-program/longitudinal-curricular-themes/>
- University of Central Florida College of Medicine. (2017b). *Integrated Curriculum*. Retrieved from <https://med.ucf.edu/media/2011/08/Curriculum-Schematic-2017.pdf>

Wald, H. S., George, P., Reis, S. P., & Taylor, J. S. (2014). Electronic health record training in undergraduate medical education: Bridging theory to practice with curricula for empowering patient- and relationship- centered care in the computerized setting. *Academic Medicine*, 89. doi:10.1097/ACM0000000000000131