An Accelerated Journey: Unearthing the Perceptions and Experiences of Students in One Baccalaureate-M.D. Training Program

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An Accelerated Journey: Unearthing the Perceptions and Experiences of Students in One Baccalaureate-M.D. Training Program

An Exploratory Quality Improvement Capstone Project

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About the Author

Jenny M. Crouch - Over the past ten years, Jenny Crouch has worked in various aspects of student services, including both Admissions and Financial Aid. Prior to her time in education, she enjoyed a career in syndicated television and broadcast news. Jenny holds a Bachelor of Arts in English Literature from Baruch College, a senior college of The City University of New York, where she received the 2007 *Excellence in English* award. In 2015, she earned a Master of Science in Organizational Leadership from Brenau University where she was deemed the 2015 *Outstanding Graduate in Organizational Leadership*. She is also a 2018 graduate of The Johns Hopkins University, where she earned a Master of Arts degree in Communication, with dual specializations in Public and Media Relations and Health Communication. Jenny has presented posters on transitioning to a Multiple Mini-Interview (MMI) medical admissions process at both the AAMC's 2019 national *Learn Serve Lead* conference and the AAMC's Group on Student Affairs (GSA) spring 2021 conference. She currently serves on the Executive Board of the National Association of Medical Minority Educators (NAMME) as the Co-Communications chair for the Southern Region.

Dedication

This capstone project is a culmination of twenty years of hard work and sacrifice. I dedicate this project to my family and all of my educational and professional colleagues who have supported me on this academic adventure. To Cohort-4, thank you for the new friendships. I could not have asked for a more supportive peer network. To Dr. Quinn Trank, thank you for being so available and supportive during this arduous process. To my son, may this project serve as tangible proof of what you can accomplish if you work hard and believe in yourself. To my mom, thank you for serving as an educational role model. This would not have been possible without your guidance and support. To my husband, thank you for maintaining your support, and humor, through three years of late nights, busy weekends, and rushed dinners. You are my North Star. To my dad, you did not see this accomplishment but the pride you showed at my undergraduate commencement propelled me to this moment. To my sister, this is for both of us. To the students, staff and faculty at the medical school featured in this report, thank you for opening your doors to me and allowing me to pursue this capstone project. To all of my work colleagues, thank you for giving me the time, space, and support I needed to push forward. Finally, to all of the health care providers who exhibited unbelievable grit and resilience during the COVID-19 pandemic, this work is dedicated to you and the continued pursuit of enhancing medical education training programs.

Executive Summary

Each year, a small percentage of students pursue a combined Baccalaureate-M.D. pathway to physician licensure. Often called BS/M.D. or BA/M.D. degree programs, these medical training pathways allow competitive students to accelerate their entrance into the medical profession by condensing and combining undergraduate education with the beginning of the professional medical school curriculum. Though academically rigorous, combined pathway programs are beneficial to both students and society in that the accelerated nature of these programs decreases students' financial burdens, while expediting a diverse group of future practitioners into the shrinking physician workforce. Prior research on these programs suggests that combined pathway students have academic outcomes similar to their traditional medical school peers. Yet, to date, little research has focused on the day-to-day experiences and satisfaction levels of combined pathway students, who elect to pursue a career in medicine early on in their last year of secondary education. Therefore, this project seeks to unearth the personal, social and organizational perceptions and experiences of students in one Baccalaureate-M.D. training program, whose recent measures of student satisfaction have remained stagnantly neutral. The primary purpose of this project is two-fold: 1) to add to the understanding of this specific student population, and 2) to leverage key findings into actionable strategic initiatives for improving student satisfaction levels within a specific medical school in the Northeast. In an effort to protect student privacy, the name of the organization will remain confidential throughout this report.

Problem of Practice

Despite institutional efforts to create and foster a supportive learning environment, quantitative assessments of the medical student experience within the organization have returned higher-than-anticipated neutral student satisfaction results. If left unaddressed, these neutral perceptions could have a negative impact on future reaccreditation evaluations. Therefore, this quality improvement project seeks to address the institution's problem of practice by investigating the day-to-day experiences of the organization's current medical students. By doing so, this project provides supplemental, qualitative insight into specific contextual aspects of the organization's learning environment. Executive leaders may use the findings and recommendations contained within this report to inform new strategic initiatives aimed at enhancing student satisfaction. Through an analysis of existing quantitative secondary data, the collection of new qualitative data, and a consideration of evidence and industry-based best practices found in the literature, this project provides two feasible recommendations for improving the organization's stated problem of practice.

Research Questions & Findings

Using social learning theory and conceptualizations put forth by Gruppen et al., (2019) regarding the learning environment of health professions, the following research questions aim to explore the personal, social and organizational factors affecting student satisfaction. A snapshot of the findings are as follows:

1. What psychosocial expectations of the medical school experience existed prior to participation in the first year of medical education?

New, qualitative data revealed that many student expectations were unrealized, with 75% of interviewed participants expressing incongruences between actual experience and initial expectation. Students' comments revealed expectations of having a non-traditional college experience and anticipations of academic rigor. However, these ideas were not congruent with students' actualized experiences, which necessitated high levels of independent self-study.

2. What psychosocial perceptions exist of the medical school learning environment?
   a. Specifically, what are the personal experiences of medical students?

Existing quantitative results from the Association of American Medical College's (AAMC) Year-Two Questionnaire Survey (Y2Q) revealed that students reported lower levels of self-confidence, in comparison to their national medical school peers, even though teachers at the organization were found to have expressed high levels of confidence in students' abilities. New qualitative data illuminated these findings, revealing difficulty with testing as the most prominent theme in the personal line of questioning, along with fear of academic failure, and concerns over academic progression, which also emerged as substantial personal areas of concern. These themes were also prevalent in the social realm of questioning, where students revealed the detrimental effects of peer attrition on self-perception.

   b. Specifically, what are the social experiences of medical students?

Using existing Y2Q learning environment scales as a scaffold, social experiences were conceptualized in this project as student-student and student-faculty interactions. Secondary, Y2Q scale results revealed that perceptions of interpersonal networks within the organization fell below the national average. During interviews, participants expressed influential peer connections, while extensively commenting on the loss of peer support networks due to peer attrition, which is a common occurrence among pre-med students (Zhang, et al., 2020). Impactful faculty mentoring was referenced by the most participants during the social realm of questioning. Of note, no second-year students discussed mentoring experiences, suggesting isolation may occur as students prepare for the first physician licensing examination.

Research Questions & Findings (Continued)

c. Specifically, what aspects of the organization contribute to positive and negative student perceptions?

Qualitative data was used exclusively to uncover the organizational experiences and perceptions of students. While opinions on the design of the curriculum were mixed, with fourth-year students looking at the design more favorably, opinions regarding curriculum delivery methods were clearly delineated. Students expressed negative perceptions of passive curriculum delivery methods and positive perceptions of active curriculum delivery methods. Of note, for the purposes of this project, active curriculum delivery encapsulates everything from hands-on learning to lectures involving two-way communication. Passive curriculum delivery is conceptualized strictly as non-interactive lectures. External to these findings, students expressed a connection with the organization's mission in ways that translated into feelings of joy, gratitude and contentment with school selection.

Recommendations

The aforementioned findings informed the following theory of change: "*If the organization can build students' personal perceptions of self-efficacy through enhanced academic programming and formalized social networks, then student satisfaction should increase in subsequent evaluations."*

Given the theory of change, two people-centered organizational improvement initiatives emerged from industry-based best practices:

Recommendation #1: *Individualized Learning Assessments*

As difficulty with testing, fear of academic failure, concerns over academic progression, and the loss of peer networks through peer attrition were found throughout all eight interviews, it is recommended that the organization build students' perceptions of self-efficacy through enhanced academic programming aimed at improving self-study and test-taking skills. Following a model put forth by the University of Colorado School of Medicine (UCSOM), the organization is encouraged to assess individualized learner aptitudes after students complete the first year of academic, undergraduate work and again in the first year of medical school. These individualized assessments can then be used to design study and test-taking strategies specific to the learner and his/her educational and personal circumstances (Guerrasio, et al., 2017). Though initially designed by UCSOM as part of remediation efforts, program creators suggest the benefits of early implementation, prior to student testing experiences (Guerrasio et al., 2017). UCSOM has seen measurable academic success with 96% of program participants showing improvement on exams following program participation (Guerrasio et al., 2017). Implementation of this recommendation requires personnel resources with an estimated ten hours of faculty time, per participant (Guerrasio et al, 2017). However, this recommendation is feasible for the organization, as it primarily requires committed faculty time and buy-in from the parent university.

Recommendations (Continued)

Recommendation #2: *Faculty-Paired Learning Communities*

The second part of the theory of change involves the creation of formalized social networks. Along with recollections of impactful faculty mentoring, influential peer connections and the loss of peer networks through attrition permeated participant discussions with six out of eight participants making 18 unique references of peer-to-peer influence. Therefore, it is recommended that the organization adopt a model of faculty-led social learning communities, made popular by Johns Hopkins University School of Medicine (JHUSOM) (Stewart et al., 2009). A 2016 investigation found that 102 U.S. medical schools have adopted similar learning communities as a tool for strengthening students' social connections with peers and faculty, while providing a supportive environment in which new professional identities are formed (Osterberg, et al., 2016). Learning communities at the University of Iowa's Roy J. and Lucille A. Carver College of Medicine (UICCOM) resulted in increased student engagement and positive views of the learning environment (Rosenbaum, et al., 2007). To realize this improvement strategy, the organization could divide students into five or more inter-peer academic houses, or units, to be led by two faculty advisors. Participation in these houses should include formal and informal social and professional development activities. Students should be placed in these units in the first year of medical study to strengthen social bonds while mitigating the psychological impact of peer attrition. Implementation of this recommendation requires the resources associated with dedicated faculty time, but is feasible for the institution as they pursue their goal of increased student satisfaction.

Introduction to the Medical Profession

The medical profession is home to one of society's oldest and most well-regarded communities of practice. Artifacts date the presence of these communities back to the 10th century BCE, with evidence showing that practitioners had established protocols for prescribing methods of treatment long before the conveniences of modern medicine (Teall, 2014). Emerging in approximately the 4th/5th century BCE, the Hippocratic Oath provided a much-needed set of ethics, norms and values for the medical community, the tenets of which are perpetuated today (Hulkower, 2010). Included in the Hippocratic Oath is the "promise to teach those who swear the oath" the practices and ideals of the medical profession (Hulkower, 2010, p. 41). This commitment to the learning of new members was so vital to the propagation of the profession, that Hippocrates compared the relationship between physician and medical student to a familial one, most closely resembling a relationship between parent and child (Calman, 2006). Over time, the predominant one-on-one verbal tutelage system morphed into more classroom-based physician training structures, with the first formalized medical school opening in Pennsylvania in 1765 (U.S. Department of Health, Education & Welfare (DHEW), 1976). These historical training structures mimic modern training programs; however, the start of these educational programs was wrought with scandal and inconsistency.

In the 1800s, privately owned medical schools, with lower admission standards and sub-par training facilities, saturated America (DHEW, 1976). Many of these schools produced inept physicians who tarnished the profession's long-standing reputation (DHEW, 1976). In response to these inadequacies in training, the Association of American Medical Colleges (AAMC) was founded in 1876 to oversee and improve medical education within the United States (AAMC, n.d.). In 1905, the AAMC confronted the medical school diploma mill by tackling what the *New*

York Times called, “Factories for the Making of Ignorant Doctors” through the creation of a standardized medical school curriculum requiring 4,000 hours of instruction (AAMC, n.d. para 6). Under the AAMC’s guidance, the 1920s ushered in a new M.D. curriculum in which students were required to complete two years of pre-clinical education and two years of hands-on clinical education, a model that remains predominate in medical education (DHEW, 1976). In 1942, the AAMC and the AMA, or American Medical Association, came together to create the Liaison Committee on Medical Education (LCME), which serves as the accrediting body for all U.S. based M.D. training programs (AAMC, n.d.). In 2021, the LCME reported overseeing approximately 155 accredited traditional allopathic, or M.D., training schools around the U.S. (LCME, 2021). Despite the existence of these numerous training programs, gaining acceptance to medical school, and admittance into one of the nation’s most revered communities of practice, remains an elusive dream for many aspiring physicians.

Joining the Physician Community of Practice

Of the 53,030 individuals applying to medical school in 2020-2021 only 22,239, or approximately 42%, matriculated into U.S.-based medical education programs (AAMC, 2020a). With less than half of the students applying to medical school matriculating into a U.S. M.D. training program, early assurance admission pathways have become increasingly more attractive. Students interested in pursuing medicine have several admission pathways available including Early Assurance, Early Decision, M.D./PhD, and the more traditional Regular Decision admissions process. A less common admissions pathway is through completion of a Baccalaureate-M.D. degree. These programs, often referred to as BS/M.D., BA/M.D., and/or combined Baccalaureate-M.D. programs, offer competitive high school students a committed seat in medical school upon completion of select, institution-specific undergraduate requirements

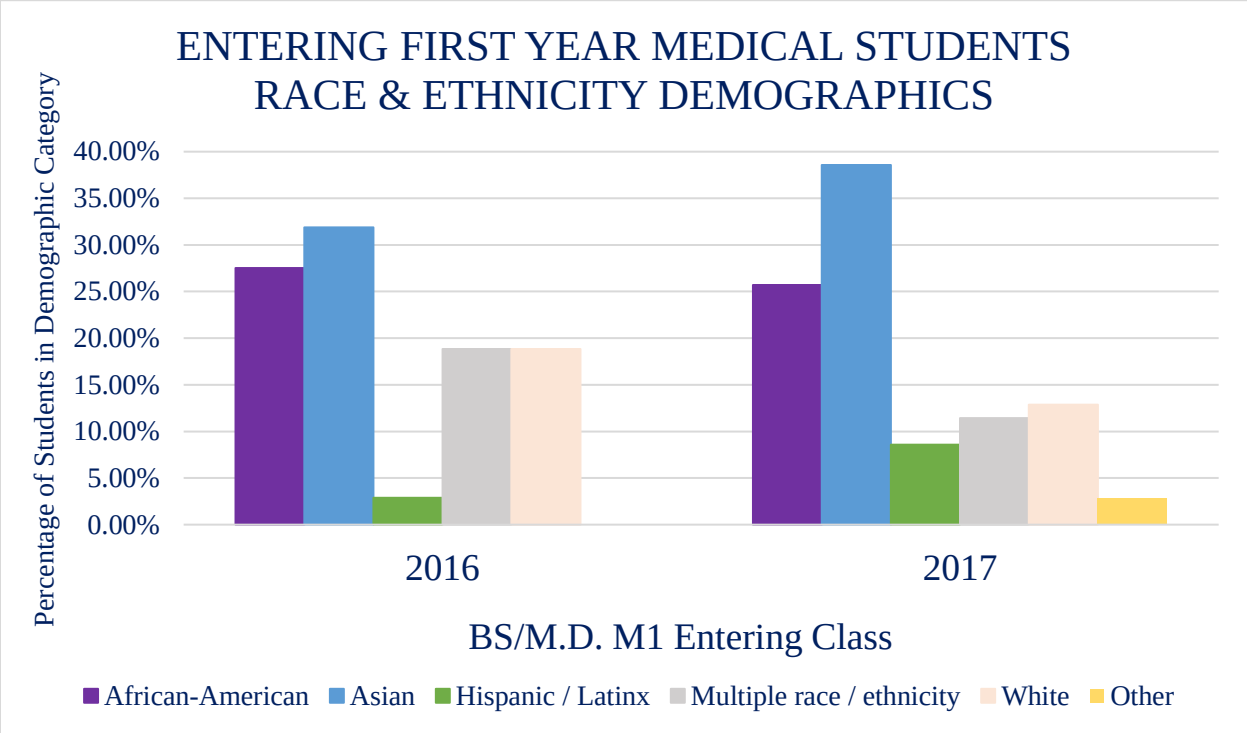
(Eaglen, et al., 2012). Combined education programs are most often offered through a collaboration with an undergraduate school and a professional program, within the same parent university (AAMC, n.d.c). Students enrolled in these programs are expedited into medical training, typically by joining the last year of undergraduate education with the first year of medical, professional school training. In 2018, the AAMC found that just 2.6% of surveyed medical school graduates participated in combined Baccalaureate-M.D. education programs (AAMC, n.d.c). While a combined program provides a more assured path to medical school, the associated academic and psychological demands make these programs the least explored pathway for those hoping to join the medical profession.

Organizational Background

The Baccalaureate-M.D. program, or BS/M.D. program, at the medical school highlighted in this report functions under a well-established parent university. Like many of its medical training peers, the organization works to produce a diverse group of future physicians who will represent the racial and ethnic composition of the population and contribute to the care of underserved communities. Students in the combined pathway program at the medical school participate in an integrated curriculum in which they complete three years of undergraduate study, followed by four years of professional medical training. Upon completion of all academic and service-based requirements, the parent university confers both a Bachelor of Science and a Doctor of Medicine degree to students. Candidates for the BS/M.D. program undergo a rigorous holistic review process in which academic metrics, communication skills, and clinical exposure are considered ("Report of the Chancellor's task force…," 2020). Admission to the program is competitive but given applicants' level of study when admitted, the Medical College Admission Test (MCAT) is not required. Applicants, whose proficiencies are deemed appropriate, must

also interview with faculty and students before an offer of admission is made ("Report of the Chancellor's task force…," 2020). Institutional data provides a snapshot of demographics for students matriculating into the first year of medical study in years 2016 and 2017 ("Report of the Chancellor's task force…," 2020) [See Figure 1].

Figure 1: Entering First-Year Medical Students by Race / Ethnicity

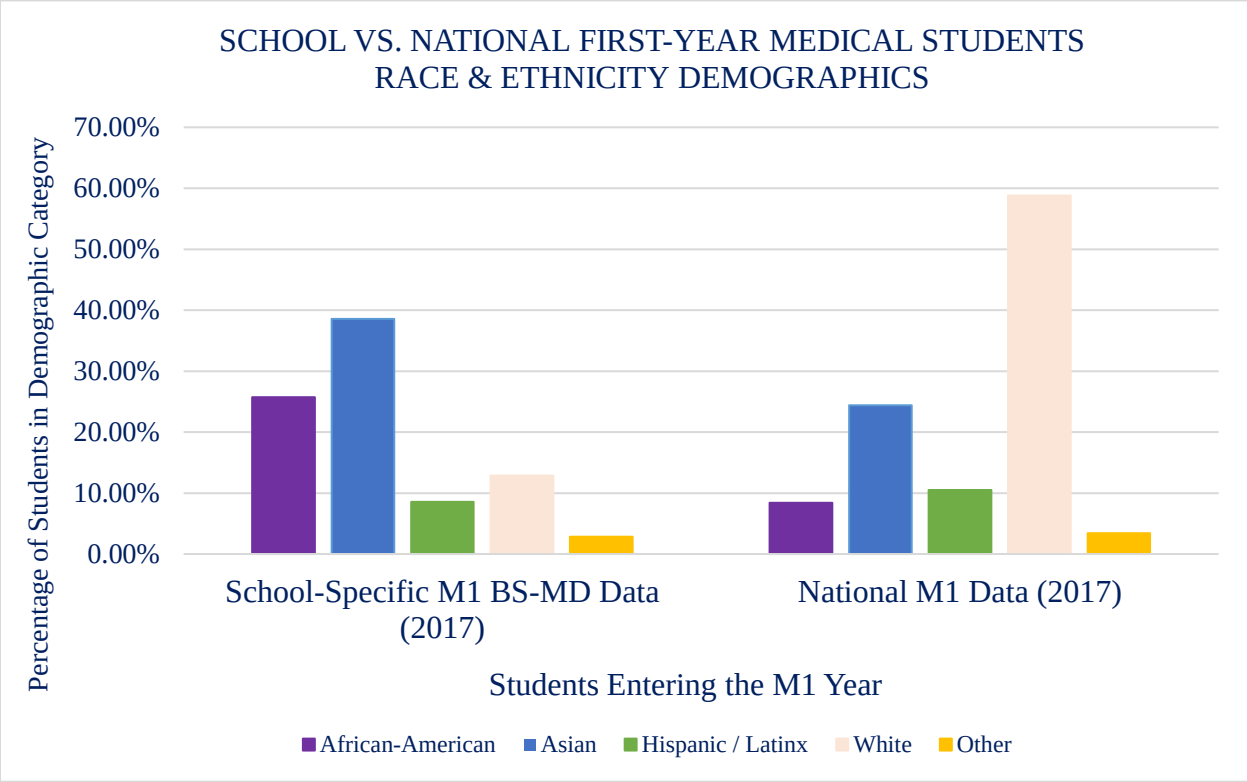


**Figures converted to percentages for confidentiality*
*** Multiple-race / ethnicity are comprised of African-American and Hispanic/Latinx students*
Source: ("Report of the Chancellor's task force…," 2020)

Asian students comprised a large majority of the class at 31.9% in 2016 and 38.6% in 2017, while Black or African-American students were the next most prominent demographic group, followed by White students and multiple race/ethnicity students, who were also comprised of both African-American and Latinx students ("Report of the Chancellor's task force…," 2020). Self-identified Latinx students were the least represented group in both years, comprising only 2.9% of the class in 2016 and 8.6% in 2017. In contrast to this diversity, U.S. medical school data compiled by the AAMC shows a predominately-white national medical

school matriculant pool (AAMC, 2020b). Of the 21,030 medical students matriculating to U.S. training programs in 2017, 58% self-identified as White, either alone or in combination with an additional race/ethnicity. In comparison, there were just 10.5% Hispanic / Latinx matriculants and 8.4% Black or African-American matriculants, either alone or in combination with an additional race/ethnicity (AAMC, 2020b) [See Figure 2; Appendix A].

Figure 2: Comparison of Entering First-Year Medical Students by Race / Ethnicity in 2017



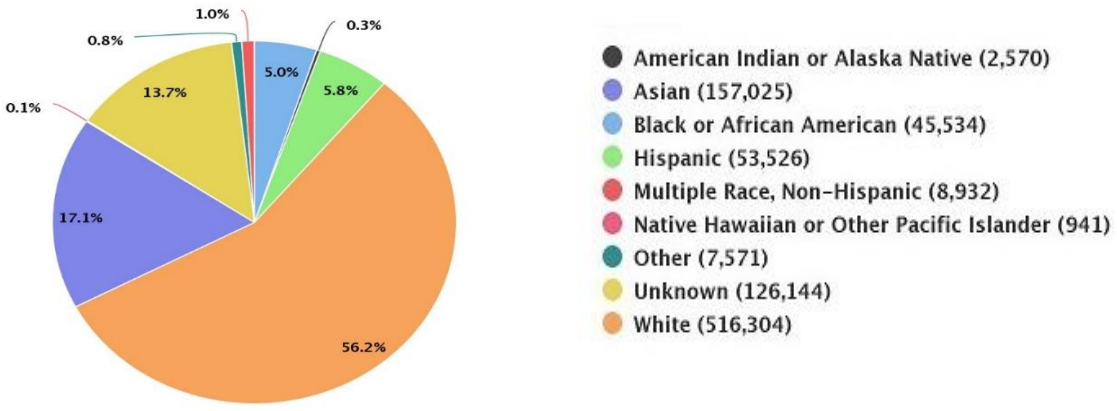
Sources: ("Report of the Chancellor's task force…," 2020; AAMC, 2020b)
**National figures are presented in percentages, alone or in combination with another race/ethnicity; therefore, multi-race was not included as a separate category*
***Data is for the 2016-2017 application year*

Diversifying the Profession

Conversations about, and strategies for, diversifying the physician workforce have occurred for decades; yet, there have been few achievements when it comes to increasing the number of underrepresented physicians in medicine. The AAMC defines students who are underrepresented in medicine (URM) as those whose, "...racial and ethnic populations [sic] are

underrepresented in the medical profession relative to their numbers in the general population" (AAMC, 2004, para. 3). The AAMC's focus on diversity stems in part from the positive effect a diverse physician workforce has on patient health outcomes, with underrepresented students being more likely to care for those in medically underserved areas (Xierali et al, 2018). Yet, many students of color never make it into the final stages of the medical education pipeline. Structural racism has led to inequitable K-12 educational environments in which students of color have been historically disadvantaged (Lucey & Saguil, 2020). These inequities, coupled with a focus on academic-centric medical admission practices, have led to a shortage in the number of URM medical school matriculants. A recent longitudinal analysis in *The New England Journal of Medicine* confirmed these racial disparities in medical education, highlighting the fact that African-American male enrollment in medical school has declined from 3.1% in 1978, to 2.9% in 2019 (Morris et al., 2021). As a result, representation of people of color in the U.S. physician workforce is also limited (AAMC, 2019). AAMC data shows that in 2018, only 5.8% of the physician workforce identified as Hispanic and a mere 5.0% as African American (AAMC, 2019) [See Figure 3 below].

Figure 3: 2018 Physician Workforce Data



Source: *(AAMC, 2019). Reprinted /Adapted with permission*

Replenishing the Profession

Diversity and issues of access are not the only challenge facing the medical profession. Recent estimates from the AAMC suggest that by the year 2033, the U.S. will face both primary and specialty care shortages (Heiser, 2020). Over the next decade, the AAMC projects that there will be a shortage range of 21,400 – 55,200 primary care physicians (Heiser, 2020). Estimates surrounding non-primary care specialties are equally as worrisome with a projected shortage range of between 33,700 and 86,700 physicians (Heiser, 2020). These shortages have been attributed to several key factors, most notably population growth and the effects of a retiring physician workforce (Heiser, 2020). The organization's combined BS/M.D. program helps offset these anticipated shortages by reducing the number of years students spend in training and accelerating professional entry for a diverse group of eager young physicians.

Purpose of the Study

Given the organization's demonstrated commitment to expediting physicians into the professional workforce and increasing diversity within that workforce, understanding the nuances of students' experiences within the organization is of paramount importance. Therefore, the primary purpose of this study is to uncover the personal, social and organizational experiences of current medical students within the organization's medical school learning environment, in order to better understand contributors of positive and negative student perception and ultimately, student satisfaction. While not a causal study, insight gained from the data collection process will be applied to the design of action-oriented improvement strategies, for use by the organization's primary internal stakeholders.

Organizational Stakeholders

Organizational stakeholders can be broken down into three categories: primary, secondary and tertiary stakeholders (Lohrey, 2017). Primary stakeholders, or evaluation stakeholders, will glean the most benefit from this exploratory project as they can use the results to implement strategic change (Bryson & Quinn Patton, 2015). The primary stakeholders for this investigation are school-level executive leaders, parent university executive leaders, and school-level academic and administrative Deans, such as the Associate Dean for Student Affairs and the Assistant Dean for Diversity and Educational Affairs [See Table 1 Below]. As student satisfaction levels influence LCME reaccreditation evaluations, these three groups of primary stakeholders have the highest interest in uncovering student perceptions and the highest levels of power to create and evaluate organizational improvement initiatives.

Secondary stakeholders include full and part-time faculty and staff, as well as adjunct faculty and current students. While these parties may have a high degree of interest in the findings of this project, they lack high levels of power within the organization to implement system-wide strategic change. However, this group of stakeholders is important as they may act as "process champions" who work to sustain improvement strategies (Bryson & Quinn Patton, 2015, p.42). Additionally, faculty and staff whose practices are reviewed in learning environment surveys and who have daily interactions with enrolled students, may find this project particularly useful in bolstering student-faculty interactions. Finally, tertiary stakeholders include those who are external to the organization but have an interest in the satisfaction levels of students, such as AAMC & LCME leadership and prospective students. While all stakeholders may find this project informative, the primary stakeholders have the most power to draft new institutional policies, make decisions on the allocation of financial and human resources, and/or

implement new support structures to improve the medical school learning environment and resolve the organization's problem of practice.

Table 1: Organizational Stakeholders by Category

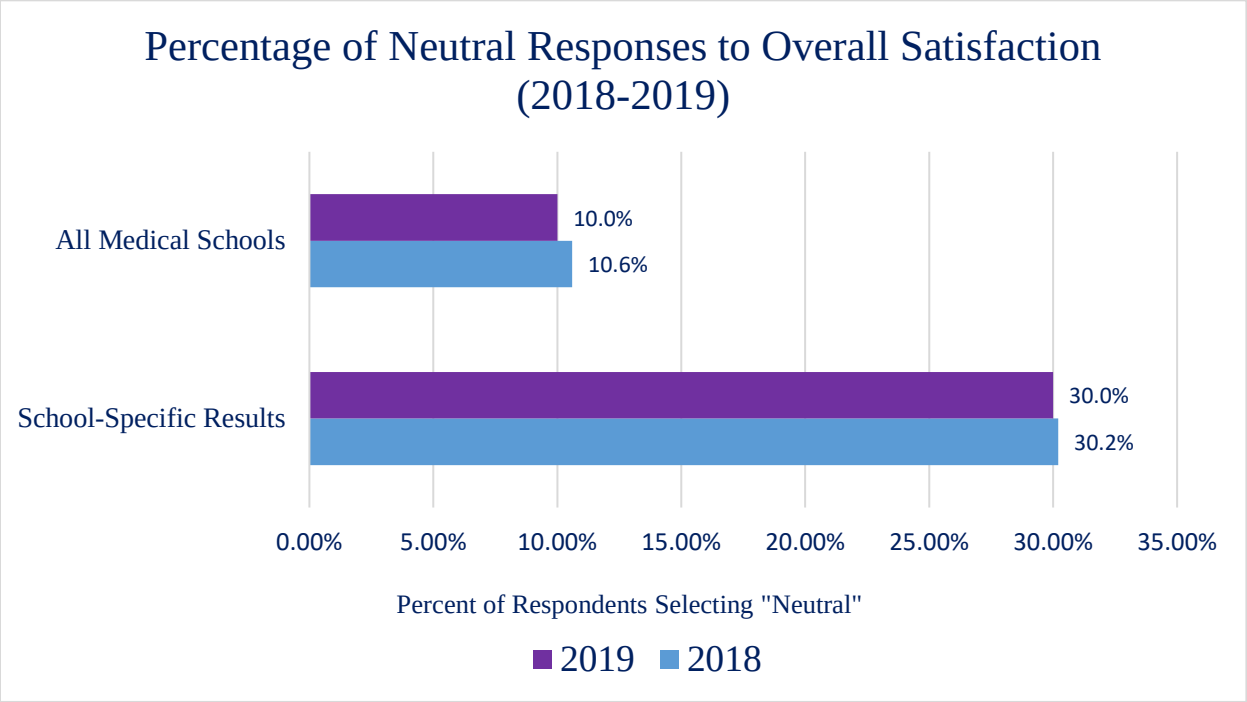
Primary Stakeholders
School-level Executive Leaders • Dean of the medical college
School-level Academic & Administrative Deans • Associate Dean for Student Affairs • Assistant Dean for Diversity and Educational Affairs • Assistant Deans in the basic science and clinical curriculum
Parent University Executive Leaders • University President • Executive Vice Chancellor & Provost • Senior Vice President for Academic Affairs
Secondary Stakeholders
Science and Clinical Faculty & Full-time Staff • The Director of Evaluation and Assessment • Internal evaluation specialists • Various department chairs
Part-time Faculty • Adjunct science and/or clinical instructors
Current medical students • U1 –U3 students • M1–M4 students
Tertiary Stakeholders
AAMC Leadership & LCME Accreditors
High School Counselors within Enrollment Management's Targeted Recruitment Areas
Prospective Medical Students • Parents of Prospective Medical Students
Parents of Currently Enrolled Medical Students

Problem of Practice

As an M.D. granting institution, the organization is tasked with balancing oversight of rigorous academic and professional student standards, while designing, sustaining, and evaluating student support structures. To measure the organization's effectiveness at managing these tasks, the AAMC administers surveys to medical students at two points in time, in both the second and fourth year of training (AAMC, n.d.a.; AAMC, n.d.b.). The first of these surveys is the *Year-Two Questionnaire*, or as it is commonly referred to, the "Y2Q" (AAMC, n.d.a) [See Appendix B]. This survey is sent exclusively to second-year medical students to investigate "the learning climate," "adjustment to medical school," and "future career plans" (AAMC, n.d.a., para.2). The AAMC then compares school-specific student responses to those of students in the second year of medical study across all LCME-accredited U.S. medical colleges (AAMC, n.d.a). Results from the 2018 and 2019 Y2Q survey show that despite institutional efforts to create and foster a supportive learning environment, quantitative assessments have returned higher than anticipated neutral student satisfaction results (AAMC, 2019a; AAMC, 2018).

One key question on the Y2Q survey asks students to reply to the statement, "*Overall I am satisfied with the quality of my medical education*," by selecting either a "Strongly Disagree," "Disagree," "Neutral," "Agree," or "Strongly Agree" response (AAMC, n.d.a). In 2018, 53.5% of students at the organization chose the "Agree" response, with 30.2% opting to select a "Neutral" response (AAMC, 2018). In comparison, only 10.6% of second-year medical students nationwide selected "Neutral" in response to satisfaction with their own, unique medical school experience (AAMC, 2018). Results from the 2019 Y2Q survey yielded similar neutral student satisfaction results [See Figure 4 below].

Figure 4: Comparison of Neutral Satisfaction Responses on the 2018/2019 Y2Q Surveys



Source: (AAMC, 2019a; AAMC, 2018)

In 2019, the number of students opting for an "Agree" response at the organization remained steady at 53.3% (AAMC, 2019a). Of interest is the elevated number of neutral satisfaction ratings across two Y2Q survey years. Results from 2019 indicate that once again 30.0% of students elected to submit a "Neutral" response, compared to 10.0% of all medical students (AAMC, 2019a). As a note, these neutral student satisfaction ratings declined from 40.4% in 2017 (AAMC, 2017). These quantitative findings suggest the need for improvement initiatives within the organization. Therefore, this investigation seeks to provide complementary qualitative insight into the perceptions of students, with the purpose of increasing student satisfaction on subsequent Y2Q surveys. To do so, a collection of stated student experiences will be triangulated with individual survey responses from the 2019 Y2Q, as well as insight from evidence-based literature.

Literature Review

Origins of combined Baccalaureate-M.D. pathways date back to the early 1960s at institutions such as Northwestern University Medical School and Boston University School of Medicine (Eaglen et al., 2012). Since that time, combined programs have grown in popularity, with a reported 51 U.S. medical schools offering combined undergraduate pathways in 2021 (Gonnella, 2021). Students enrolled in these programs experience both the psychological benefit of early and assured admission, as well as the financial benefit of reduced student debt (Cheema, 2018). In a public health context, Baccalaureate-M.D. programs serve as a mechanism for triaging a rising physician shortage through early recruitment of high achieving and diverse students (Eaglen et al., 2012). A recent 8-year analysis of AAMC data found that 49% of students in combined medical training programs intended to pursue careers in primary care specialties, as compared to 43.5% of their peers who were admitted to medical school through traditional admission pathways (Merritt, et al., 2021). By expediting students' transition into the physician workforce, combined programs play a vital role in replenishing physician vacancies. Yet, concerns have been raised regarding the maturity and career readiness of these students, who commit to a career trajectory early on in their last year of high school.

Recent studies on the emotional and psychological attributes of combined pathway students are limited; however, a former study out of the University of Miami found that 41% of traditional medical students felt that the maturity level of their combined education classmates was below the average for their class (Jacobs, et al., 1988). While many of the voiced objections surrounding combined student readiness are anecdotal, combined education students have proven to score slightly lower on the Medical Career Development Inventory (MCDI) assessment, in areas such as career specification, compared to their traditional medical education peers (Borges,

et al., 2007). Yet, data on the academic outcomes of combined pathway students suggests that any concerns surrounding emotional maturity or career readiness, do not extend to matters of educational and professional accomplishment.

Academic Outcomes

Combining the last year of undergraduate study with the first year of professional level M.D. coursework necessitates a shift in academic workload. In order to progress into the first year of professional study, some combined education training programs require students to enroll in double the course hour recommendations of traditional undergraduate programs (Cheema, 2018). Students are often expected to complete these extra hours of coursework in tandem with other clinical and service-based requirements, such as physician shadowing and community-based engagement, in order to progress through the undergraduate curriculum and into the professional program (University of South Florida, n.d.). Given these common program requirements, combined education students may find themselves facing an increased academic burden early on in their educational experiences. Early exposure to increasing academic demands may have an advantageous effect on students as they move into more rigorous medical training and ultimately licensing exam preparation. A 15-year longitudinal comparison study of combined BA/M.D. honors-program students and traditional medical students at the Northwestern University Feinberg School of Medicine revealed no statistical difference in M.D. completion rates, residency match rates, or average licensing exam scores among students, despite varying age differences (Green, et al., 2016). Additionally, research has found no statistical difference between these groups in other expected scholarly pursuits, such as admission into honor societies and peer-reviewed publication rates (George, et al., 2016). Despite the arduous

academic demands of both the undergraduate and medical education curricula, students in combined programs have seemingly demonstrated the ability to keep pace with the academic outcomes of their traditional peers. While research has documented a multitude of academic accomplishments for these students, population-specific research on the satisfaction rates of students in combined Baccalaureate-M.D. training programs is limited.

Student Satisfaction

Assessments of student satisfaction are vital to medical education training programs as positive perceptions of the medical school learning environment, specifically positive perceptions of a "meaningful environment, emotional climate, and student-student interactions," have been found to correlate to increased performance on the USMLE Step-1 physician licensing exam (Wayne, et al., 2013, p.379). Recognizing the academic impact of the learning environment on student experience, the LCME tasks medical schools with identifying positive and negative aspects of the learning environment, while working to enhance positive experiences (LCME, 2020). Maintaining desired student satisfaction levels may prove more arduous for combined pathway programs, as a comparison study of BS-M.D. and traditional pathway medical students at Jefferson Medical College / Pennsylvania State University found that B.S./M.D. students were less satisfied with the second year of medical school than their traditional counterparts (Gonnella et al., 2021). Reasons for this are speculative, but could include common medical student stressors such as the pressure to meet oppressive academic demands and feelings of personal and professional isolation (Cheema, 2018). While little research is dedicated specifically to the learning environment perceptions of combined pathway students, a survey of these students at the University of Missouri-Kansas City School of Medicine uncovered specific stressors in the learning environment that

were problematic, such as physical learning spaces and organizational structures and evaluation systems (Calkins, et al., 1994). Additional, personal stressors associated with medical students, but not specific to Baccalaureate-M.D. students, include monetary concerns, lack of time for interpersonal interactions, and burdens associated with learning large amounts of academic material (Calkins, et al., 1994). Combined pathway students are exposed to performance pressures for longer periods of time than their traditional peers, who have expressed similar stressors upon entering the medical school learning environment, such as academic outcome related fears and social exclusion (Coburn & Jovaisas, 1975). Prolonged exposure to these stressors can result in decreased levels of educational satisfaction and a phenomenon common to health care professionals, known as psychological 'burnout.'

Burnout. Burnout is a mental condition resulting from striving to meet environmental demands for an extended period to time. Three main attributes commonly associated with burnout include, "emotional exhaustion, depersonalization, and loss of sense of personal achievement" (Chang, et al., 2012, p. 177). A 2020 report suggests that approximately 42% of physicians experience burnout, with millennial generations blaming administrative bureaucracy, overtime, and a lack of respect from others as the top three contributing factors (Kane, 2020). Burnout is of particular concern in the physician community as it can contribute to negative patient outcomes and may serve as an impetus for unhealthy physician behavior, or self-harm (West, et al., 2018). Burnout is a serious threat to physician retention and safety but it is not exclusive to practicing physicians. Research shows that prolonged feelings of stress, depression, and exhaustion extend to physicians in training, as well as their professional peers.

Student Burnout. Students enrolled in medical training programs may not face the same external demands as physicians in the clinical environment but they do experience many of the same mental stressors. It is estimated that approximately 50% of all medical school students experience burnout (Song, 2020). One cross-sectional study of 336 medical students across years one, two and three of study, confirmed this estimate with 50% of surveyed students exhibiting symptoms of burnout (Chang, et al., 2012). An examination of medical students at Vanderbilt University also found that feelings of psychological exhaustion become particularly problematic as students progress into, and through, their clinical years (Santen, et al., 2010). In this study, grades and professional uncertainty emerged as two of the most prominent student stressors (Santen, et.al, 2010). Sentiments of stress have been expressed by medical students through comments such as, *"In the first two years the only thing that matters is Step 1; It's always on your mind"* (Hill, et al., 2018, p.5). As well as, *"I stress about deciding which field I want to go into for the rest of my life"* (Hill, et al., 2018, p.6). Resolving these types of academic and professional pressures may be the first step in alleviating medical student burnout, but additional relational factors, such as social interactions and intricate race dynamics, also have the potential to negatively impact the student experience.

Considerations of Race / Ethnicity

In a survey of medical students at the University of Florida College of Medicine, 50% revealed that they had had encountered micro-aggressions, or "subtle putdowns directed towards a marginalized group" at some point during their first two years of medical school (Espaillat, et al., 2019, p.144). Experiences such as these have been found to affect student performance. A cross-geographical analysis of medical students of color in Minnesota, Washington, Illinois, and Alabama found that those who "perceived that their race had adversely affected their medical

school experience" were more likely to exhibit symptoms of burnout (Dyrbye, 2007, p.2105-2106). Compounding the issue of micro-aggressions in the learning environment is a commonly acknowledged lack of diversity in medical education faculty. Focus groups conducted with African-American high school juniors revealed pervasive expectations of racism within the medical profession, including possible patient encounters, and mental constructs of doctors as predominantly Caucasian males (Rao & Flores, 2007). Data from a 2018 examination by the AAMC validates the physician stereotype, as 63.9% of all full-time medical school faculty members in the United States were found to be White, compared to 3.2% Latinx and 3.6% African American faculty members (AAMC, 2019). Acknowledging the lack of faculty diversity, medical students of color at the University of Chicago suggested that low levels of racial representation actually impeded student success (Dickins, et al., 2013).

These findings are coupled with research substantiating the difficulties students of color face in finding same-race role models and mentors (Bright, et al., 1998). Relational interactions are an important basis for the creation of satisfaction with the learning environment; yet, evidence suggests that students of color have differing social experiences and satisfaction levels than those of students in the majority (Orom, et al., 2013). The lack of same-race role models may create a deficit in the creation of new professional identities and feelings of inclusivity, which have been found to influence perceptions of the learning environment (Shochet, et al., 2013). To understand the psychological, social and organizational factors contributing to medical student burnout, and subsequent levels of satisfaction or dissatisfaction, a working conceptualization of the learner within the medical school learning environment is needed.

Conceptual Framework

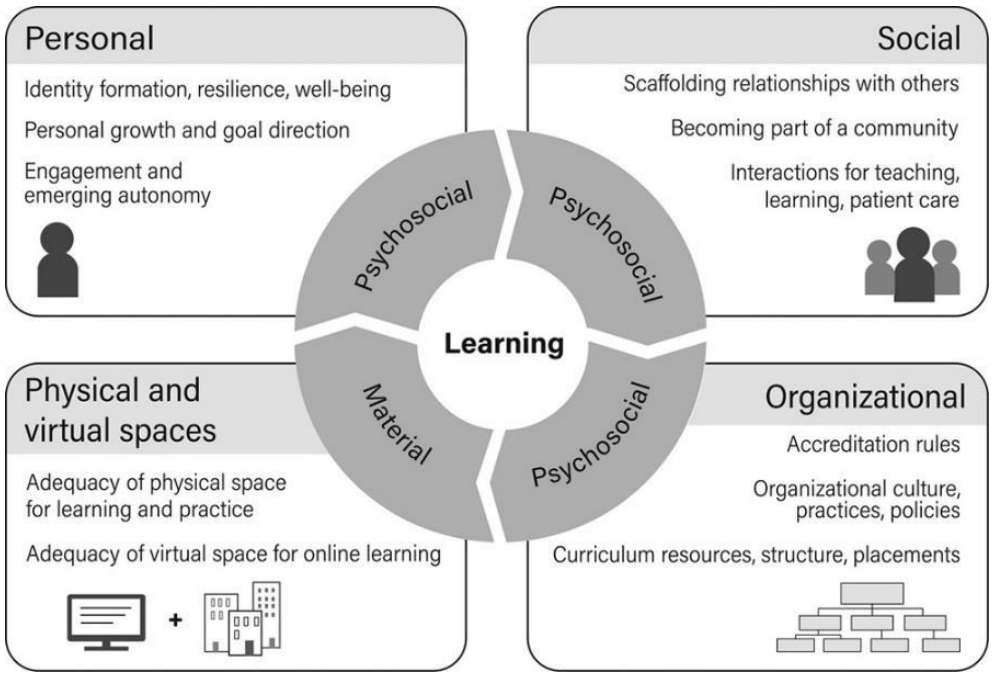
Early, cognitive studies of individual learning have given way in recent years to a more social, context-based view of the learner's interaction within a given environment. Albert Bandura's Social Learning Theory emphasizes this interaction, proposing that individuals create their own reality through a system of interdependent interactions between the person, their behavior, and the external environment (Grusec, 1992). Bandura refers to the influences between these entities as "reciprocal determinism" in which a series of mutual cause and effect events influence individual behaviors, thus altering the environment and subsequent expectations (Bandura, 1978, p. 344). According to Bandura (1978), in any given instance the person, their behavior, or the environment may become the dominant influence on individual perception and action. Opinions of environment and experience are highly individualized and dependent upon individual cognitive infrastructures, which are built from past personal interactions and recent situational experiences within the educational setting (Bandura, 1978). Social Learning Theory emphasizes individualized perception and the active influence of the educational setting on the learner; therefore, it serves as the underlying theory supporting the inextricable connections between student perception, experience, and the medical school learning environment.

Key Conceptualizations

Prominent educational climate researcher J.M. Genn (2001) describes the medical school learning environment as an atmosphere, portraying values through reward systems and expressions of tone. Gruppen, et al., (2019) further compartmentalize this description of the medical school learning environment by dividing it into two main spheres of consideration: the psychosocial and the material [See Figure 5 Below]. Aspects of the psychosocial category include personal considerations, social interactions and organizational structures and influences

(Gruppen, et al., 2019). The material realm is more tangible and is comprised of the physical and virtual spaces in which learning occurs (Gruppen, et al., 2019).

Figure 5: Health Profession Learning Environment Conceptualization



Source: (Gruppen, et al., 2019)

Together, students' psychosocial experiences and exposure to material affordances in the learning environment, produce intertwining effects on perception and student satisfaction. These effects harken back to Bandura's Social Learning Theory, where the individual is constantly shaping, and being shaped by, personal beliefs and external social and organizational factors within the learning environment. As terms such as 'learning environment' and 'student satisfaction' may be interpreted in various ways, definitions for these terms, as they apply to the medical school learning environment conceptualized by Gruppen. Irby, Durning and Maggio (2019), have been provided in Table 2 below.

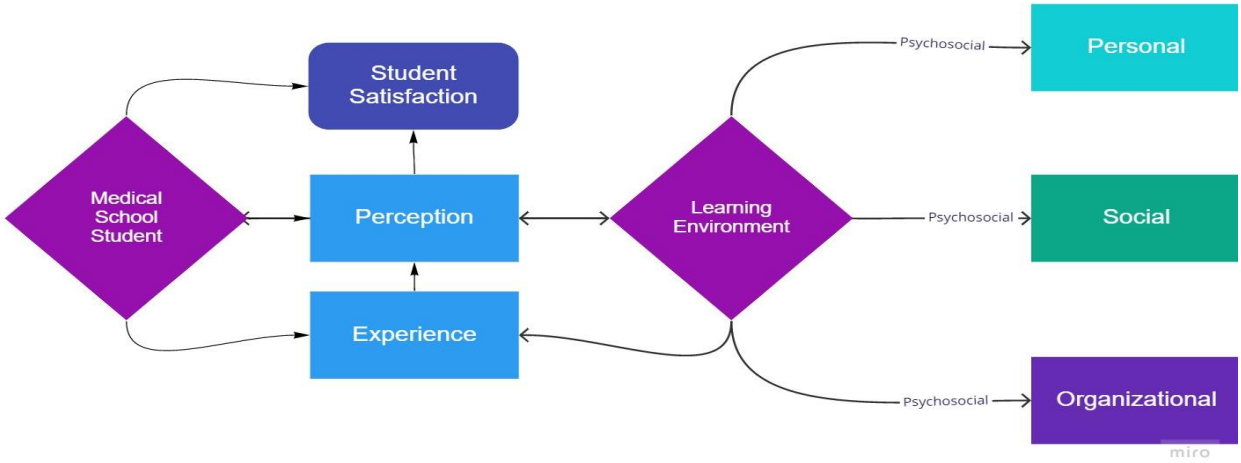
Table 2: Key Conceptualizations & Definitions

CONCEPT	DEFINITION
Learning Environment	For the purposes of this project, the learning environment is defined as the individual (personal), interpersonal (social), and cultural (organization) influences affecting student perception (Gruppen, et al., 2019).
Student Satisfaction	For the purposes of this project, student satisfaction is defined as an individual's overall perception of contentment within the learning environment.
Psychosocial	Involving individual thought processes, interpersonal interactions, and experiences with formal organizational rules and policies (Gruppen, et al., 2019).
Personal	Aspects of the individual, psychological medical student experience. This can include aspects of time management, self-efficacy, academic success/failure, stress/anxiety, mental health and identity formation: • **Stress** – Anxiety surrounding academic concerns, time management, and financial concerns (Kaufman, et al., 1998). • **Identity** – "professional identity formation" in which students transition into members of a larger community of physicians whose norms and values they must adopt (Peterson, et al., 2017, p. 102).
Social	Concerning student-student or student-faculty interactions.
Organizational	Involving aspects of the curriculum, the hidden curriculum and organizational mission and culture: • **Hidden Curriculum** - Included in the hidden curriculum are considerations of organizational policy, evaluation structures, resource distribution, and shoptalk (Hafferty, 1998).

Connections to Student Satisfaction

To understand expressions of neutral student satisfaction within the medical school learning environment, one must first conceptualize and operationalize student satisfaction. Student satisfaction is an individual's overall perception of contentment within the learning environment; it is most often operationalized through the categorization of both positive and negative perceptions. Contributing to these perceptions are the personal, social and organizational experiences students have within the medical school learning environment (Gruppen, et al., 2019). Figure 6 below illustrates the interdependent nature of student perception and experience on overall student satisfaction.

Figure 6: Student Satisfaction Conceptualization



Experiences are internalized through a series of personal constructs, social interactions, and navigation of the organization's culture and climate. For example, experiences of personal stress and identity confusion, may compromise student well-being, thus reducing overall positive perceptions of the learning environment. Similarly, social interactions serve as integral determinants of learning environment perceptions, with 76% of graduating medical students at The Johns Hopkins University School of Medicine reporting that "working with enthusiastic and motivating teachers" heavily impacted their learning environment experience (Shochet et al.,

2013, p.248). Findings from the Indiana University School of Medicine also support the impact of social interaction on perception, with students ranking collegiality, collaboration and community as positive contributors to the learning environment (Suchman et al., 2004). An assumption of this model of student satisfaction is that positive perceptions lead to higher levels of student satisfaction and negative perceptions contribute to lower levels. Given elevated neutral satisfaction ratings on the Y2Q survey, this project's research questions were designed with the purpose of unearthing student perception and experience, not attempting to find causality between student satisfaction levels and positive and negative student perception.

Research Questions

Drawing on Albert Bandura's Social Learning Theory (Grusec, 1992) and Gruppen, et al.,'s (2019) conceptualization of health profession learning environments, two research questions were drafted to investigate the initial expectations and current perceptions of the personal, social and organizational realities of students enrolled in the organization.

Research Question 1:

What psychosocial expectations of the medical school experience existed prior to participation in the first year of medical education?

Research Question 2:

What psychosocial perceptions exist of the medical school learning environment?

a. Specifically, what are the personal experiences of medical students?
b. Specifically, what are the social experiences of medical students?
c. Specifically, what aspects of the organization contribute to positive and negative student perceptions?

Project Design: Recruitment, Sample & Collection

The purpose of this descriptive, exploratory project is to investigate the day-to-day experiences of students at a medical school in the Northeast and to uncover the exchanges and occurrences that influence student satisfaction within the medical school learning environment. In July 2020, Vanderbilt University's Institutional Review Board (IRB) acknowledged this quality improvement investigation under its original title, "Challenges from Within: Student Success and the Medical School Learning Environment." In February 2021, the project received additional IRB acknowledgement from the confidential organization under an amended title. Results of this project may be used for organizational improvement purposes, as this effort does not seek to definitively link student satisfaction to positive and negative perceptions, nor draw causal conclusions. Instead, through consideration of secondary quantitative data and primary qualitative data, this project strives to provide a holistic, contextual understanding of the student experience, resulting in a base of knowledge for future organizational inquiry.

A Mixed Methods Approach

Data from the organization's 2019 Y2Q survey, referenced earlier in the *Problem of Practice* section of this paper, contains quantitative information on students' perceptions of the learning environment within the organization. In addition to overall satisfaction rankings, the Y2Q also provides insight on personal and social aspects of the organization through three Learning Environment Scales (AAMC, 2019a). These scales, which measure emotional climate, student-student interactions, and student-faculty interactions, are rooted in the Medical School Learning Environment Survey (MSLES), which is recognized as a way to measure student perception (AAMC 2020; Marshall, 1978). Insight from 2019's Y2Q Learning Environment Survey scale results were used as the impetus for additional, contextual qualitative inquires.

The Qualitative Component. Medical and scientific communities commonly rely on quantitative data to understand the scope and severity of external phenomena. Yet, qualitative investigations help provide much needed contextual understanding of quantitative figures. Therefore, this project combines the validity of existing quantitative survey data with situational understanding through a cross-sectional qualitative design. Early in the project's conception, focus groups emerged as the intended qualitative data collection method to encourage collective interaction, group sensemaking, and interpretation (Gioia & Thomas, 1996). To this end, a series of three focus groups were scheduled for March 2021 to coincide with downtime in the students' academic calendar. Initially, two separate focus groups were designed for students in years one and two of professional study. A third focus group was designed to allow for inter-year interaction and to encourage memory retrieval, as students in the clinical years would mix with students in the pre-clinical years. Despite multiple recruitment efforts in tandem with the organization's leadership, five students signed up to participate in the focus groups, four of which did not appear for the virtual meetings.

Ultimately, due to a lack of student participation the project was reimagined with one-on-one, semi-structured interviews emerging as the new qualitative format. Given the difficulty of participant recruitment, an incentive was added to encourage students to participate in virtual interviews. On March 25, 2021, Vanderbilt IRB did not find issue with the following two amendments: 1) A change in qualitative methodology from focus groups to one-on-one interviews and 2) the addition of a $100 Amazon gift card raffle to incentivize student participation. On April 1, 2021, the organization's IRB formally acknowledged this change in methodology and solicitation of participants began once again.

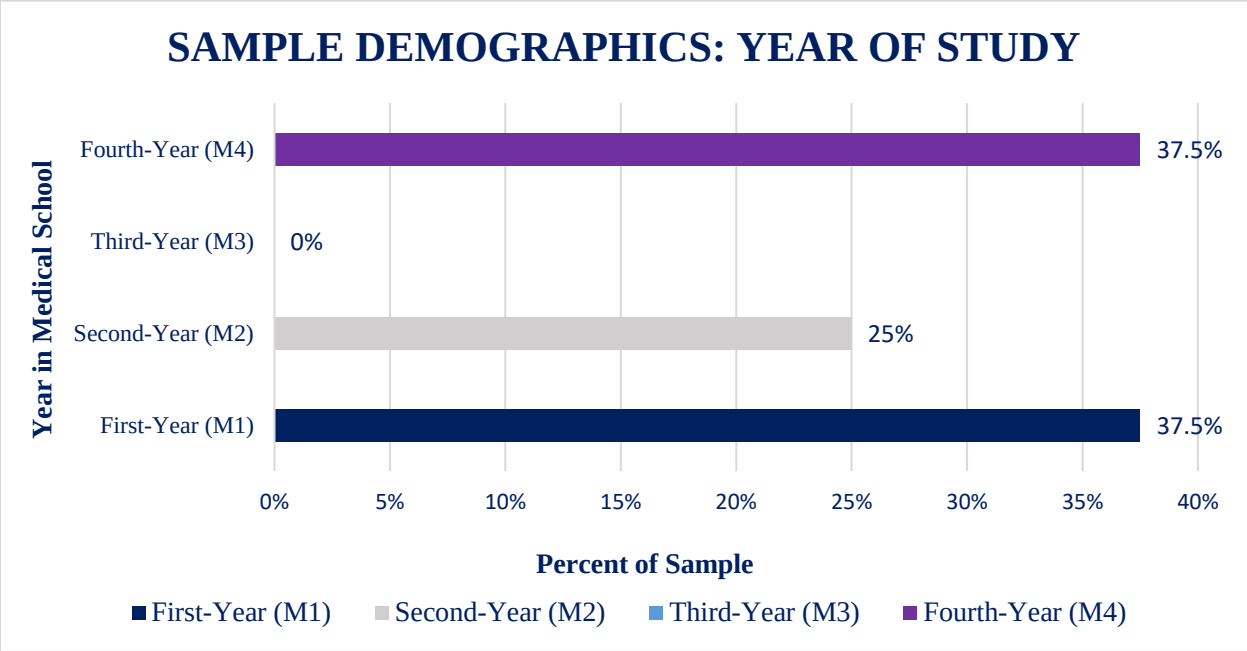
Participant Recruitment & Sample

To collect current student perspectives, the project used a voluntary response, non-probability sampling technique. Participants in the first (M1), second (M2) and fourth (M4) years of study were invited to participate in qualitative interviews. While it would have been beneficial to include third-year (M3) students, these clinical students were dispersed across multiple rotation settings and were not as available as many of their pre-clinical and fourth-year peers. In an effort to mitigate selection bias, students were primarily recruited through mass email solicitation via the Assistant Dean for Diversity and Inclusion, who served as the primary gatekeeper for the institution. Email solicitations to the M1 and M2 classes provided students with an external Qualtrics participation registration link so that interview availability, contact information, and demographic data could be collected prior to the interview process.

Throughout student communications, the project was presented as a way to inform organizational improvement initiatives aimed at increasing student satisfaction for both current and future students. Email communications reminded students that participation was confidential and that no faculty or administrators associated with the school would be present in the sessions. Solicitations included information on informed consent, the recording of sessions, and the need for all participants to be at least 18 years of age. On Tuesday April 6, 2021, a virtual recruitment visit was made to the M1 class during their monthly class meeting. A similar visit was made to M4 students on Wednesday, May 5, 2021. Students were informed via email, and during these virtual site visits, that participants of the project would automatically be entered into a raffle for a $100 Amazon gift card which was distributed at the end of the data collection process. After two months of participant recruitment efforts, eight students registered to participate in one-on-one interviews.

Sample Demographics. Of the eight sample participants, three were in the first year of study, two were in the second year of study, and three participants had completed their fourth year of clinical study and were in the midst of preparing to transition into various residency programs. Students in the M1 and M2 pre-clinical years comprised the largest percentage of the project's total sample [See Figure 7 Below].

Figure 7: Sample Demographics: Year of Study



As in years of study, the age, gender, and race/ethnicity of participants varied and provided a diverse and representative sample [See Table 3 below].

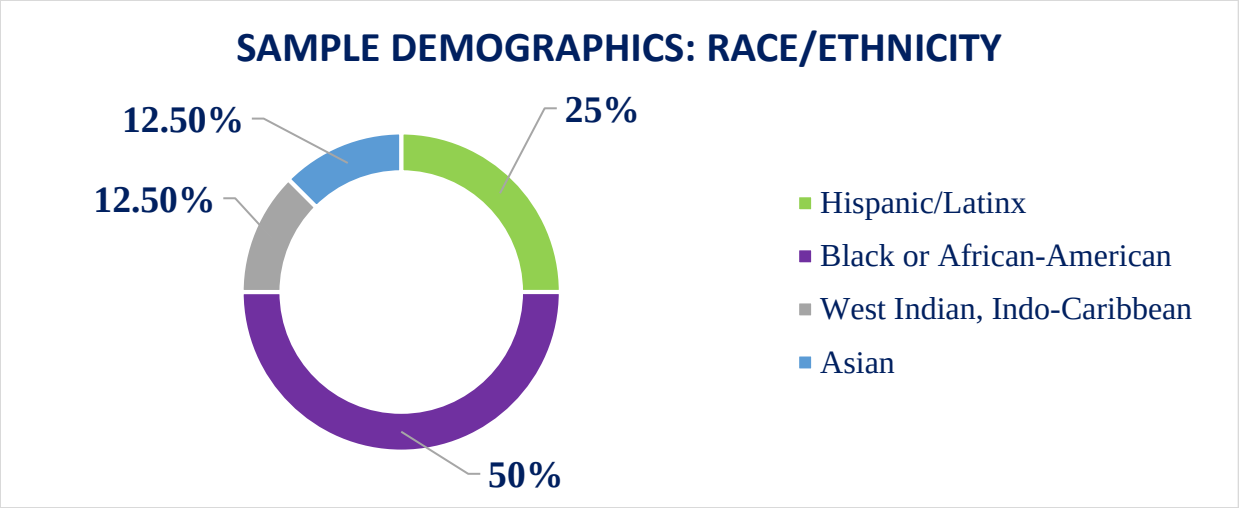
Table 3: Participant Demographics by Year of Study, Gender, Age Range & Race/Ethnicity

PARTICIPANT (N=8)	YEAR OF STUDY	GENDER	AGE RANGE	RACE / ETHNICITY
Participant 1	M1	Female	20-25	Hispanic/Latinx
Participant 2	M1	Female	20-25	Black or African-American
Participant 3	M1	Male	20-25	Hispanic/Latinx
Participant 4	M2	Female	20-25	West Indian, Indo-Caribbean
Participant 5	M2	Female	20-25	Black or African-American
Participant 6	M4	Male	20-25	Black or African-American
Participant 7	M4	Female	20-25	Asian
Participant 8	M4	Female	20-25	Black or African-American

**Participants self-reported age, gender, and race / ethnicity*

Age, gender, and race/ethnicity were self-reported by participants. In total, 75% of participants self-identified as female and 25% as male. The racial/ethnic composition of the sample was more evenly distributed, with Black or African-American students comprising 50% of the sample, Hispanic/Latinx students making up 25% of the sample and Asian and West Indian, Indo-Caribbean students both making up 12.5% of the group. One limitation to this sample is that no White students elected to participate in the project [See Figure 8].

Figure 8: Sample Demographics: Race/Ethnicity



Sample Comparison. When comparing the quantitative Y2Q sample with the qualitative sample, a few discrepancies emerge [See Table 4 below]. The Y2Q was exclusively comprised of second-year medical students, whereas the qualitative sample encompassed students from across three years of study, including both pre-clinical and clinical students.

Table 4: Data Sample Comparison

Data Source	Sample Size	Year(s) of Study	Median Age	Gender
AAMC's Year-Two Questionnaire (2019) (Quantitative)	N=60	M2	22	F: 71.7% M: 28.3%
Semi-Structured Virtual Interviews (2021) (Qualitative)	N=8	M1, M2, M4	23	F: 75.0% M: 25.0%

Source: *(AAMC, 2019a)*

While gender distribution and the median age of participants were similar, the racial and ethnic composition of participants in the qualitative sample differed substantially from those participating in the AAMC's Y2Q survey. Asian students comprised 52.1% of Y2Q surveyed participants but only 12.5% of interviewed participants (AAMC, 2019a). Black or African-American students comprised 50% of the qualitative sample but only 29.2% of the Y2Q sample (AAMC, 2019a). Similarly, Hispanic/Latinx students made up only 12.5% of the survey sample, but 25% of the interviewed sample (AAMC, 2019a). Additionally, 8.3% of participants on the Y2Q were White, as compared to 0% of the qualitative sample (AAMC, 2019a). As noted previously in this report, peer-reviewed literature suggests that students of color may have different learning environment experiences than students in the majority; therefore, the composition of these samples should be considered in comparison to the project's findings.

Data Collection

In spring 2021, a series of eight, thirty-minute, semi-structured interviews were conducted virtually via Zoom teleconferencing technology. Zoom was chosen over other video-teleconferencing platforms, such as Microsoft Teams, Webex, or Skype, as Zoom has been found to be a user-friendly and convenient platform for conducting qualitative interviews (Archibald, et al., 2019). Students who filled out the Qualtrics participation survey received a subsequent follow-up email containing links to the designated Zoom interview rooms. At the beginning of each interview, participants were reminded of the following conditions and norms of participation, as well as their rights as participants: 1) participant identities would remain confidential, 2) participants must be at least 18 years of age, 3) participants were free to leave the interview at any time and 4) participation, or non-participation, would in no way affect the participants' relationship with the organization. After the rules of participation were reviewed,

participants were asked for consent to be recorded. Only after verbal consent was given did the session begin. To ensure transparency, the Zoom recording notification was turned on and participants heard an audible reminder when recording began. To promote psychological safety, individuals were given the option to leave their cameras on, or turn their cameras off, during interviews. All eight participants verbally consented to being recorded, with only one participant electing to disable camera functionality.

As this is a quality improvement project, with low-risk to participants, consent forms were not collected prior to participation. Per HHS guidelines, obtaining informed consent forms may not be necessary if "the risk to the subjects is minimal" and "subjects are provided with additional pertinent information after their participation" (U.S. Department of Health & Human Services, n.d., para.9). To ensure these standards, the identities of participants were kept confidential and following all student interviews, participants were thanked for their participation and once again reminded of the purpose of the project. At the end of each session, participants were given an opportunity to ask any remaining questions they had about the project, including inquiries regarding the use, storage, and release of collected interview data. At multiple points throughout the participant recruitment and data collection process, individuals were reminded of the purpose of the project and the voluntary nature of participation. Due to the fact that participants gave verbal consent before the start of the interview and involvement in the project is considered to be low-risk, these protocols were deemed sufficient for participation in the interview process.

Project Design: Data Instruments & Analysis

Using this project's conceptualizations of the medical school learning environment and student satisfaction, a series of 15 semi-structured, open-ended questions were designed to correlate with the project's research questions, pre-analyzed Y2Q survey data, and the three psychosocial spheres of Gruppen et al.'s (2019) medical school learning environment [See Table 5 Below and Appendix C]. Interview questions were chosen to address five key lines of inquiry: 1) plenary, 2) personal, 3) social, 4) organizational and 5) improvement-based inquiries. First, three plenary questions were designed to ease participants into the conversation and to draw out expectations that may have existed prior to participation in the first year of medical school. Second, four questions encouraged discussion of a personal nature, involving individual student challenges and joys. Third, a set of four questions focused on the interpersonal nature of the medical school experience, with two questions used as a means to investigate student-student interactions and two questions serving to explore student-faculty interactions. Fourth, two questions were designed to prompt discussion on organizational aspects of learning, such as the curriculum and perceptions of the classroom experience. Finally, two improvement-based questions sought to provide students with an impromptu opportunity to provide unstructured feedback on their student experience. Interviews ended on question 15, which prompted participants to end the session recalling something positive about the organization and its learning environment. Due to the semi-structured nature of questioning, time spent across the five lines of inquiry varied from participant to participant. All participants had an opportunity to answer plenary and improvement questions, as well as questions involving personal, social and organizational experiences.

Table 5: Interview Questions & Correlations to Research Questions & Key Conceptualizations

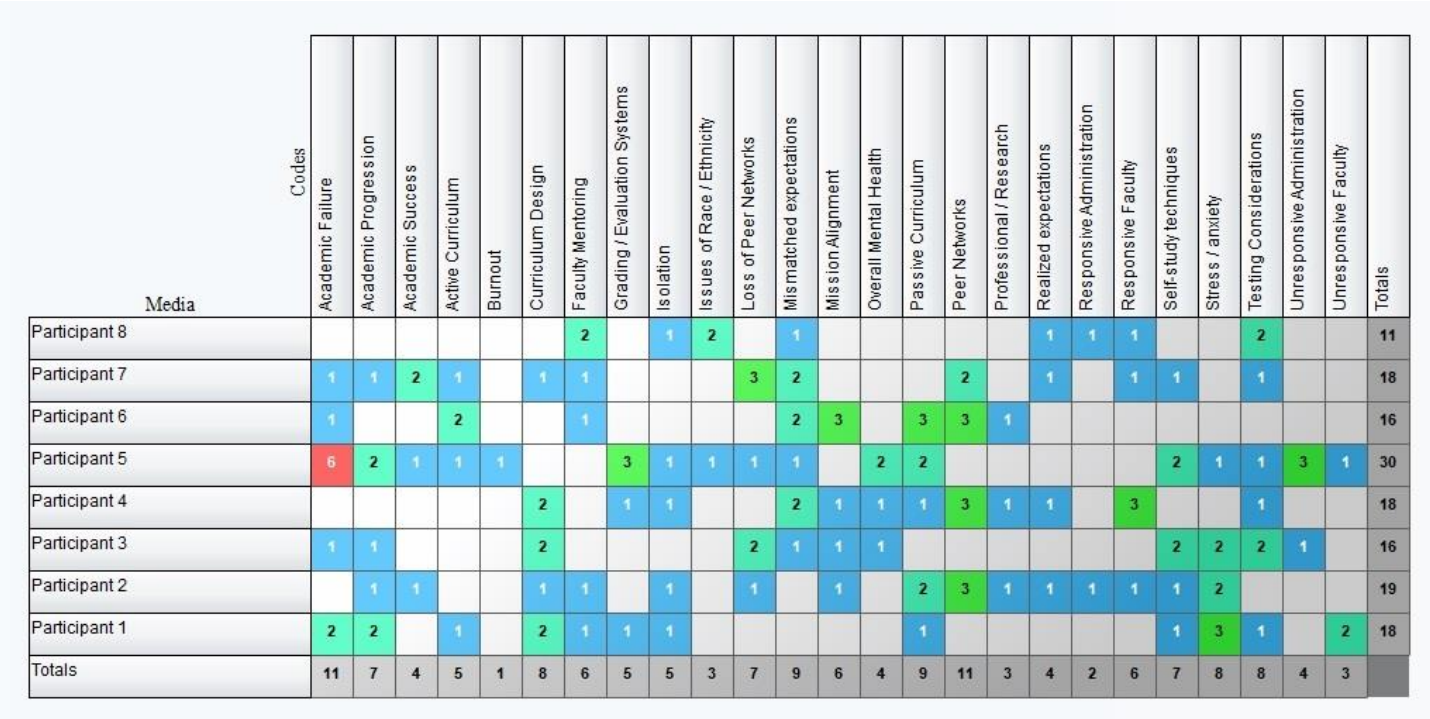
TOPIC: PLENARY *Opening questions designed to increase psychological safety and facilitate the matching of experience and expectation.*	**RESEARCH QUESTIONS:** **RQ 1:** What psychosocial expectations of the medical school experience existed prior to participation in the first year of medical education?	**INTERVIEW QUESTIONS:** **Q1**: What prompted you to pursue a career in medicine? Tell me about your journey to college. **Q2**: Think back to your days in undergrad. What was that experience like? **Q3**. Would you say your expectations have matched your current experiences?
TOPIC: PERSONAL *Questions correlate to the Emotional Climate Scale on the AAMC's Y2Q quantitative survey.*	**RESEARCH QUESTIONS:** **RQ 2:** What current psychosocial perceptions exist of the medical school learning environment? **2a**. Specifically, what are the personal experiences of medical students?	**INTERVIEW QUESTIONS:** **Q4**: Can you take me through a typical day, or week? **Q5**: As you move through your day/week, what do you find challenging? **Q6**: As you move through your day/week, what brings you the most joy? **Q7**: Are there any personal challenges that you encounter?
TOPIC: SOCIAL *Questions correlate to the Student-Student and Student-Faculty Interaction scales on the AAMC's Y2Q quantitative survey.*	**RESEARCH QUESTIONS:** **RQ 2**: What current psychosocial perceptions exist of the medical school learning environment? **2b.** Specifically, what are the social experiences of medical students?	**INTERVIEW QUESTIONS:** **Q8**: Can you describe a meaningful experience you have had with your peers? **Q9**: How would you describe the relationship among peers? **Q10**: Can you describe a meaningful experience you have had with a faculty member? **Q11**: Would you describe faculty as responsive?

TOPIC: ORGANIZATIONAL *Questions correlate to aspects of the organization including mission and structure, as well as classroom-based learning.*	**RESEARCH QUESTIONS:** **RQ 2**: What current psychosocial perceptions exist of the medical school learning environment? **2c**. Specifically, what aspects of the organization contribute to positive and negative student perceptions?	**INTERVIEW QUESTIONS:** **Q12**. Is there something in the medical education curriculum that you feel may need improvement? **Q13**: Is there something in the curriculum that is handled especially well?
TOPIC: IMPROVEMENT *Questions strive to obtain a user-centered perspective and allow for unstructured feedback.*	**RESEARCH QUESTIONS**: **RQ 2:** What current psychosocial perceptions exist of the medical school learning environment?	**INTERVIEW QUESTIONS:** **Q14**: If you could provide one suggestion to senior leadership, what would it be? **Q15**: Can you take me through something that you believe the organization has done exceptionally well?

Qualitative Coding Method

At the conclusion of each interview, recordings were transcribed through Zoom's audio transcription function. Given deficits in audio transcription accuracy, the Principal Investigator (PI) went back through participant interviews and edited the pre-populated audio transcripts to ensure precision of the data. Once transcription errors and verbal inconsistencies were removed, alternate versions of these transcripts were created to contain the sole responses of participants. The PI's questions and comments were removed so that the raw qualitative data could be accurately analyzed and coded for occurrences and themes within Dedoose qualitative research software [See Figure 9 Below].

Figure 9: Visualization of Codes in Dedoose Software



Media \ Codes	Academic Failure	Academic Progression	Academic Success	Active Curriculum	Burnout	Curriculum Design	Faculty Mentoring	Grading / Evaluation Systems	Isolation	Issues of Race / Ethnicity	Loss of Peer Networks	Mismatched expectations	Mission Alignment	Overall Mental Health	Passive Curriculum	Peer Networks	Professional / Research	Realized expectations	Responsive Administration	Responsive Faculty	Self-study techniques	Stress / anxiety	Testing Considerations	Unresponsive Administration	Unresponsive Faculty	Totals
Participant 8							2		1	2		1						1	1	1			2			11
Participant 7	1	1	2	1		1	1				3	2				2		1		1	1		1			18
Participant 6	1			2			1					2	3		3	3	1									16
Participant 5	6	2	1	1	1			3	1	1	1	1		2	2						2	1	1	3	1	30
Participant 4						2		1	1			2	1	1	1	3	1	1		3			1			18
Participant 3	1	1				2					2	1	1	1							2	2	2	1		16
Participant 2		1	1			1	1		1		1		1		2	3	1	1	1	1	1	2				19
Participant 1	2	2		1		2	1	1	1						1						1	3	1		2	18
Totals	11	7	4	5	1	8	6	5	5	3	7	9	6	4	9	11	3	4	2	6	7	8	8	4	3	

Thematic Analysis. Nowell, Norris, White & Moules (2017) reason that thematic analysis, or the formulation of common data themes, is in and of itself a method for, "identifying, analyzing, organizing, describing and reporting [qualitative] themes," especially those which seek to convey participant perspectives (p.2). An inductive coding method allowed for codes to emerge within the realms of students' personal, social and organizational experiences. To increase the trustworthiness and reliability of assigned codes, a codebook was developed containing the code, category of inquiry (i.e.: personal, social or organizational), a working definition of the concept, and an example taken from participant interviews (Nowell, et al., 2017; Roberts et al., 2019) [See Appendix D]. In total, 25 codes were identified through an inductive coding process and axial coding provided a method for identifying common themes within the codes. Taken in tandem with secondary quantitative data, the newly collected data paints a picture of the student experience within the organization's learning environment.

Project Limitations

Three major limitations of this quality improvement project involve 1) sample restrictions 2) inter-coder reliability and 3) the issue of time. The voluntary response, non-probability sampling technique threatens the external validity of this project; yet, despite its small size, the project's qualitative sample includes students from both the pre-clinical and clinical years of study, as well as both male and female participants across multiple races and ethnicities. Former BS/M.D. students who left the program, were not available for interview and should be considered as participants for future improvement investigations. Given the voluntary nature of the sample, students choosing to participate may have encountered response bias in which they felt the need to respond either positively, or negatively, to prompts. Similarly, as this was a quality improvement project, confirmation bias on the part of the PI may have influenced the project's findings and ultimate recommendations. Additionally, the PI was the sole reviewer of the qualitative data. Secondary coders were not available given the project's time constraints. To combat this limitation, the codebook containing definitions of key codes, and examples from participant interviews, can be used so that future secondary coders may be able to draw similar conclusions to the project's stated findings (Nowell, et al., 2017; Roberts et al., 2019) [Appendix D]. Finally, the issue of time remains an additional threat to the external validity of the project. The results of this cross-sectional investigation are a product of a specific moment in time and may not be applicable to the understanding of student satisfaction in subsequent time periods. As environmental factors change, so do the personal, social, and organizational realities of the medical school learning environment. As such, this project acknowledges limitations in the realms of replicability and validity but maintains its applied utility in the improvement of student satisfaction levels within the organization.

Key Findings: Unearthing the Student Experience

Eight, one-on-one semi-structured interviews generated 3 hours, 41 minutes and 42 seconds of data, with the average interview lasting 27 minutes and 44 seconds. The shortest interview ran 23 minutes and fifty-eight seconds and the longest was 32 minutes and 35 seconds. Inductive coding of this data produced 25 key codes. Eleven codes centered on the personal realm, six in the social, and eight in the organizational sector of the learning environment. The frequency of these occurrences, the number of participants referencing the code, and the percentage of participants referencing the code are available in Table 6 below.

Table 6: Key Codes Emerging from Qualitative Inquiry

QUALITATIVE CODE/THEME	FREQUENCY OF OCCURRANCE	PARTICIPANTS REFERENCING	% OF PARTICIPANTS REFERENCING
PERSONAL			
Realized expectations	4	4	50%
Mismatched expectations	9	6	75%
Academic Failure	11	5	62.5%
Academic Progression	7	5	62.5%
Testing Considerations	8	6	75%
Self-study Techniques	7	5	62.5%
Academic Success	4	3	37.5%
Isolation	5	5	62.5%
Overall Mental Health	4	3	37.5%
Stress / Anxiety	8	4	50%
Burnout	1	1	12.5%
SOCIAL			
Faculty Mentoring	6	5	62.5%
Peer Networks	11	4	50%
Loss of Peer Networks	7	4	50%
Responsive faculty	6	4	50%
Unresponsive faculty	3	2	25%
Issues of Race / Ethnicity	3	2	25%
ORGANIZATIONAL			
Mission Alignment	6	4	50%
Curriculum Design	8	5	62.5%
Active Curriculum	5	4	50%
Passive Curriculum	9	5	62.5%
Responsive Administration	2	2	25%
Unresponsive Administration	4	2	25%
Grading / Evaluation Systems	5	3	37.5%
Professional / Research Opportunities	3	3	37.5%

Twelve Key Themes

Thematic analysis and axial coding resulted in the grouping and identification of twelve key themes. These themes include: 1) Realized expectations of academic rigor, 2) mismatched expectations of self-study, 3) fear of academic failure, 4) difficulty with testing, 5) concerns over academic progression, 6) impactful faculty mentoring, 7) influential peer connections, 8) loss of peer networks through attrition, 9) curriculum design, 10) positive experiences with active curriculum delivery, 11) negative experiences with passive curriculum delivery and 12) mission alignment. Ten of the 12 themes were referenced six or more times by the project's participants. Responsive faculty and stress/anxiety were also referenced more than six times but these topics are addressed in the parent themes of impactful faculty mentoring and concerns over academic progression. Active curriculum delivery and expectations of rigor were included due to their relation to passive curriculum delivery and mismatched expectations of self-study.

While not the sole purpose of qualitative investigation, quantification of the 25 codes provides generalized insight into the prevalence of those experiences among students. Over the course of eight discussions, topics surrounding academic failure and peer networks appeared the most frequently with each code occurring eleven times. While prevalent in the literature, burnout was the least referenced code, emerging only once during discussions. Topics that were referenced by less than 50% of participants include: academic success, overall mental health, unresponsive faculty, issues of race/ethnicity, administrative responsiveness / non-responsiveness, grading / evaluation systems, and professional and research opportunities. Despite the lack of frequency of these topics, the mere presence of these ideas suggests some level of influence on student perception. Together, students' responses, coupled with secondary quantitative data, help provide insight into the project's key investigative questions.

Question #1: What psychosocial expectations of the medical school experience existed prior to participation in the first year of medical education?

Alternative to student experiences are student expectations. Expectations are mental constructs, formed prior to participation in the first year of medical study, which have the ability to influence subsequent student perceptions. Secondary data did not directly address student expectations. Therefore, student interviews provide primary insight into the anticipated experiences of students. Participants expressed both realized and mismatched expectations, with students recalling more instances of mismatched expectations, than realized expectations [See Table 6]. Questions surrounding the preconceived notions of students were posed in a way that asked participants to consider their expectations of the first year of medical school; however, some students chose to also recall expectations of the first undergraduate year, suggesting the significance of first impressions during the combined pathway onboarding process. In conversations regarding student expectations, two themes emerged, realized expectations of academic rigor and mismatched expectations of self-study.

Expectations of Academic Rigor Vs. Self-Study

Throughout discussions, respondents recalled expectations of 1) having a non-traditional college experience, 2) anticipations of career actualization, 3) expectations of a new professional identity, and 4) thoughts regarding the anticipated rigors of academic study. An M1 student whose expectations of the academic workload matched actualized experiences expressed this congruence of thought and occurrences by saying:

"I knew beforehand that it wasn't going to be a regular college experience because I knew it was going to be four years in three years…so it was not a shocker, but it was still just a lot of work…"

As participants were asked to delve deeper into their initial expectations of anticipated academic experiences, incongruences between expectations of academic rigor and the realities of self-guided study emerged. Students disclosed expectations of the long study hours needed to be successful in medical school but they also expressed mismatched expectations regarding the need for individual study initiatives in the academic process. An M4 student retrospectively described the incongruence between academic expectation and realized experience in the following way:

"I sort of expected to learn everything in the classroom and then soon came to realize that's not the case and I have to go out of my way and do a lot more legwork..."

In recent years, self-directed learning has become a matter of importance for the LCME, which tasks medical schools with incorporating self-directed learning experiences throughout the educational experience (Keator, et al., 2016). As future physicians, medical students should exhibit competencies in self-guided, life-long learning; yet, development of these skills may not occur until later in the medical school curriculum. Mismatched expectations of self-guided study was supported in the personal realm of questioning, with 62.5% of participants recalling experiences related to self-study techniques [See Table 6]. One M4 student described the adjustment to self-study as a trial-and-error process, saying:

"*…it's a tough adjustment going from like barely studying and depending on your natural intelligence to get you by… to like studying all the time and not really knowing how to study effectively… I stumbled a lot. It was a lot of trial-and-error…"*

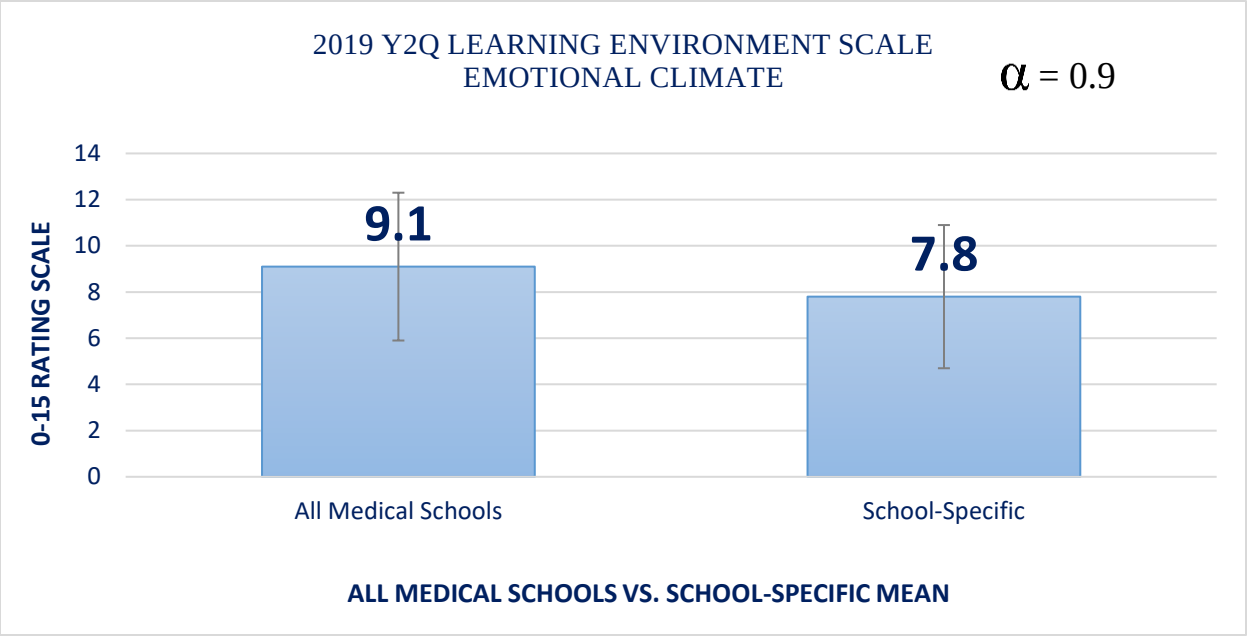
Participants conveyed common techniques for resolving this 'trial-and-error' process with two students, an M1 and M2, revealing the use of Anki flashcards to incorporate a guided, spaced-learning technique into their normal study routines. The use of Anki flashcards in medical school is seemingly commom, with a study by Deng, Gluckstein & Larsen (2015) finding that

Anki-like retrieval-based flashcard techniques, improve USMLE Step-1 licensing performance. Through use of external study aides, students have seemingly helped close the gap between expectation and reality; yet, despite the benefits of these efforts, fear of academic failure and difficulty with testing emerged as two main themes in the personal experiences of students.

Question 2: What psychosocial perceptions exist of the medical school learning environment? 2a) Specifically, what are the personal experiences of medical students?

Personal student experiences involve psychological beliefs and the internal interpretations of external circumstances. The AAMC quantitatively measures these psychological constructs through an *Emotional Climate* scale on the Y2Q survey. The *Emotional Climate* scale evaluates students' personal "sense of achievement… and confidence in one's academic abilities" (AAMC, 2020, p.8). To accomplish this goal, student perception is measured on a 0-15 rating system, in which higher student ratings "correlate with positive perceptions of the learning environment" (AAMC, 2020, p.8). Results from the 2019 Y2Q indicate that personal perceptions of the emotional climate, within the organization's learning environment, fell below the national mean of 9.1 (SD=3.2) for all U.S. second-year medical students across LCME-accredited institutions, to a school-specific mean of 7.8 (SD=3.1) (AAMC, 2019a). The organization's average falls within one standard deviation of the mean, indicating an area for improvement. Additionally, the AAMC calculated Chronbach's alpha results for the scale and found a 0.9 or 90% level of internal consistency for both the national and school-specific mean (AAMC, 2019a) [See Figure 10 Below]. Findings from the AAMC's Y2Q emotional climate scale suggest that students' confidence in their own ability to succeed as future physicians falls slightly behind national averages.

Figure 10: 2019 AAMC Y2Q Emotional Climate Scale Results



Source: (AAMC, 2019a)
Note: Error bars indicate Standard Deviation

Individual survey questions on the Y2Q provide additional insight into the underlying drivers of these perceptions. When asked if, "*My teachers and mentors have told me that they feel sure that I can perform well against high standards*," 72.9% of respondents at the organization indicated an "agree" or "strongly agree" response, compared to just 62.4% of all medical school respondents (AAMC, 2019a) [See Table 7 Below]. These responses suggest that faculty at the organization are expressing confidence in students' academic abilities; yet, students themselves are experiencing a lack of confidence in their own abilities to meet academic expectations. Two additional questions on the Y2Q survey asked students to rate how often they "*feel isolated at school*" and "*feel that [their] performance is being judged more closely by others*" (AAMC, 2019a, p.7). Responses show that students at the organization expressed slightly elevated feelings of isolation, and heightened perceptions of academic judgement, compared to their nationwide peers [See Table 7 Below and Appendix B]. These ideas were expanded upon during student interviews, where participants vocalized fear of academic failure

along with difficulty with examinations and testing. The prevalence of these findings in both data sets suggests that academic anxiety and low levels of confidence may be a result of deeply personal psychological processes.

Table 7: 2019 AAMC Y2Q Survey Responses

2019 AAMC Y2Q SURVEY PROMPT	***All Medical Schools*** *(% Strongly Agree / Agree)*	***School-Specific*** *(% Strongly Agree / Agree)*
My teachers and mentors have told me that they feel sure that I can perform well against high standards.	*62.4%*	*72.9%*
I often feel isolated at school.	*16.3%*	*18.7%*
I often feel that my performance is being judged more closely than others.	*8.7%*	*17.2%*

Source: (AAMC, 2019a, p.7)

Thematic Findings

Similar to these survey findings, recollections of isolation were also found throughout the interview process, with approximately 62% of participants referencing feelings of personal exclusion. Instances of reported stress and anxiety were present in 50% of student interviews but acknowledgment of stress, anxiety and academic pressure as contributing factors to burnout occurred only once. This suggests that while students may recognize symptoms of mental exhaustion, they do not necessarily associate these experiences with student burnout. Along with stress and anxiety, students communicated fears associated with both academic performance and career development. These concerns culminated in the identification of three prominent themes within the personal realm of the learning environment: fear of academic failure, difficulty with testing, and concerns over academic progression.

Fear of Academic Failure. When asked to recall personal challenges within the learning environment, students who were forced to take academic leave described the experience in various ways. A student who was placed on leave described the experience as "*shameful*," while another student who also experienced academic leave described the experience as, "*the best thing that ever happened to me*." Processes regarding academic failures also permeated discussions with participants repeatedly referencing a shroud of mystery involving the organization's remediation procedures. One student described the process as "*under the table*" and "*very quiet*." Another student described peer experiences with remediation as "*alienating,"* while expressing a desire for more support systems for failing students.

Noticeably absent from discussions in the personal realm were expressed feelings of utility from academic success among pre-clinical students. Students in the fourth year of study made references to personal feelings of accomplishment but this sense of academic pride was not detected in conversations with pre-clinical students. One M2 student summarized the predominance of academic fear over individual feelings of academic accomplishment, stating:

"*It hurts more to fail than I feel good to pass or master a subject."*

Feelings of fear and/or thoughts of inadequacy may originate with peer comparisons. Two students in the pre-clinical years suggested that their own individual perceptions of success were contingent upon alignment with stated class averages. While students approach the academic material from varied personal backgrounds, any deviation from the academic norm could exacerbate personal fears of academic failure. Yet, these fears may be less attributable to actual academic deficiencies and more attributable to a lack of exposure with studying and test-taking.

Difficulty with Test-Taking. Similar to expressed fears of academic failure, personal difficulty with test-taking emerged as a main theme in the qualitative analysis, with 75% of participants making 8 unique references to testing throughout the interview process. Students expressed difficulties with classroom-based examinations and recommended more transparency on testing criteria and exam content. For example, two students in the pre-clinical years of study indicated that exam material was not representative of the proportion of material that was presented in the classroom. Other participants revealed difficulties specific to standardized testing. As mentioned earlier, combined pathway students are not required to take the MCAT exam as an admission requirement; therefore, students at the organization have very little experience with standardized testing, outside of high-school based SAT/ACT exams. Students experience testing on a micro-level throughout their academic program; however, exposure to lengthy tests, such as the 8-hour USMLE Step-1 exam and the 9-hour USMLE Step-2 exam, is limited. An M4 student who noted the lack of test readiness among students said:

"I think test prep and test-taking strategies [are] something that is not taught at all and I think is super key going into board exams and especially when you are dealing with students [sic] that did not have to take the MCAT."

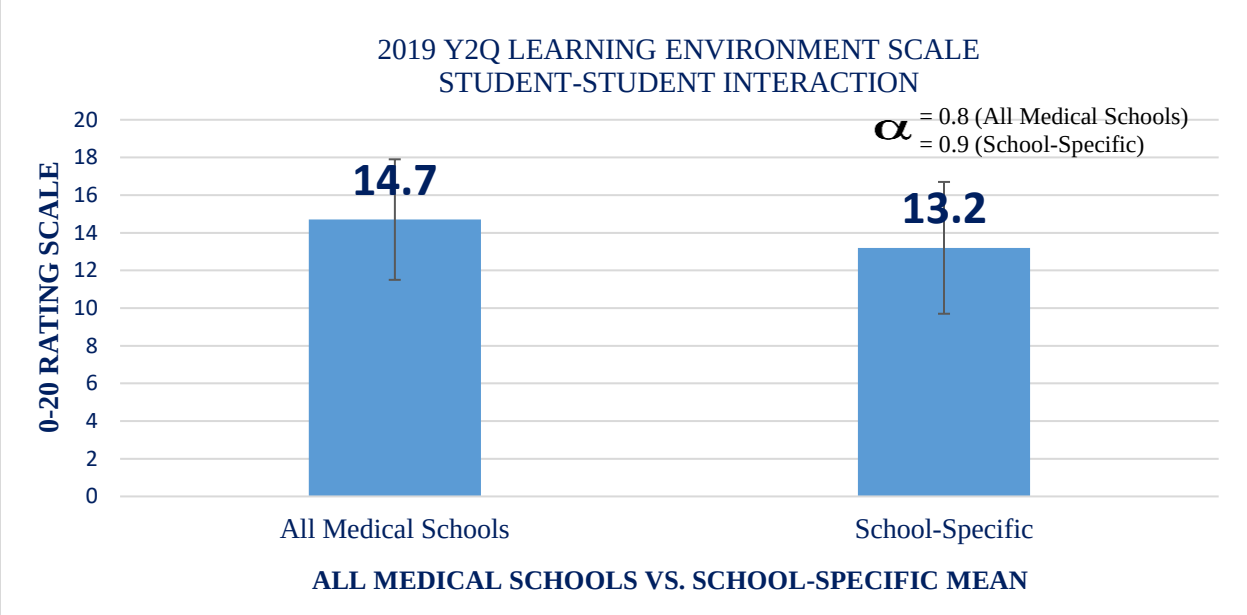
The difficulties students expressed with test-taking fed into additional conversations highlighting specific concerns over their personal ability to successfully progress through the program. Though concerns over academic progression initially arose during conversations in the personal realm of questioning, this theme was fully illuminated in the social realm of questioning, where students revealed the detrimental effects of peer attrition on self-perception. The interdependence of these two themes further supports Bandura's suggestion that external environments and social relationships have the ability to influence personal, psychological constructs and ultimately individual behavior.

Question 2b: Specifically, what are the social experiences of medical students?

The social experiences of students were conceptualized using the *Student-Student Interaction* scale and the *Student-Faculty Interaction* scale on the AAMC's Y2Q survey (AAMC, 2020). As with the *Emotional Climate* scale, these two scales attempt to quantitatively measure student perceptions of interpersonal interactions using a 0-20 scoring range, with high scores correlating with positive perceptions (AAMC, 2020). Questions on the *Student-Student Interaction* scale gauge the closeness of peers, levels of peer support, and perceptions of non-structured social activities (AAMC, 2020). Similarly, questions on the *Student-Faculty Interaction* scale focus on the helpfulness of faculty, as well as faculty's perceived ability to answer questions and provide feedback (AAMC, 2020).

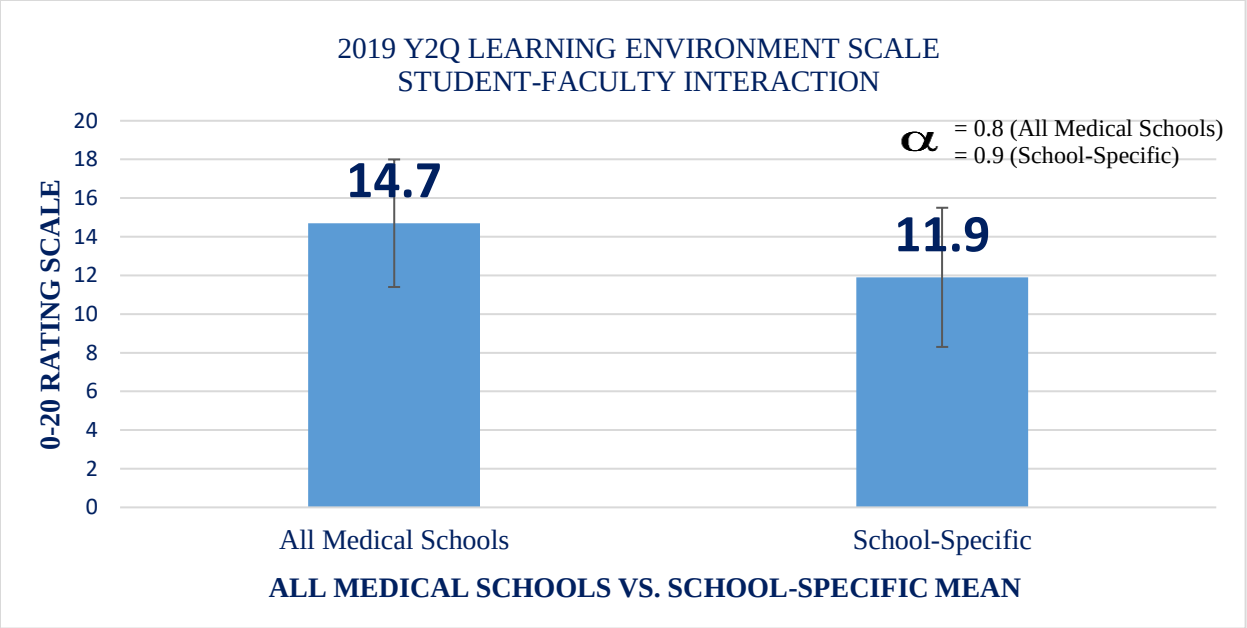
Scale results from the 2019 *Student-Student Interaction* scale, show that the organization fell within one standard deviation of the national mean, reporting a mean score of 13.2 (SD=3.5) in comparison to a 14.7 (SD=3.2) average among second-year medical school respondents nationwide. [See Figure 11 below]. The AAMC's calculation of Chronbach's alpha for this scale indicates a high level of internal consistency, at 0.8 or 80% reliability for the national mean and 0.9 or 90% reliability for the school-specific mean (AAMC, 2019a). Results from the 2019 *Student-Faculty Interaction* scale show that the organization fell within one standard deviation of the national mean, scoring 11.9 (SD=3.6) in comparison to 14.7 (SD=3.3) among nationwide respondents [See Figure 12 Below]. Again, Chronbach's alpha results indicate high levels of internal consistency, with the national score having 0.8 or 80% reliability and the school-specific score having 0.9 or 90% reliability (AAMC, 2019a) [See Figure 12 below]. These findings suggest some social separation among peers, and elevated levels of social disconnect among students and faculty, findings which were not fully supported in the qualitative investigation.

Figure 11: 2019 AAMC Y2Q Student-Student Interaction Scale Results



Source: (AAMC, 2019a)
Note: Error bars indicate standard deviation

Figure 12: 2019 AAMC Y2Q Student-Faculty Interaction Scale Results



Source: (AAMC, 2019a)
Note: Error bars indicate standard deviation

Thematic Findings

Discussions surrounding the social dynamics within the organization varied. One participant outwardly addressed the social dynamics among students, calling them "*stringent*." Another participant alluded to the "*drama*" that occurs within the program's small cohort. Others described their relationships with peers using words such as "*close*, "*caring,"* and "*best friends*." Over the course of eight student interviews, there were 11 cited experiences pertaining to peer networks and 7 mentions of the loss of peer networks [See Table 6]. Similarly, faculty were discrepantly described as both exhibiting "*a lack of mindfulness*" and "*warm and friendly*." Overall, conversations surrounding the social aspects of the organization resulted in the identification of four key themes: influential peer connections, loss of peer networks through attrition, concerns over academic progression and impactful faculty mentoring. Interestingly, despite the varied demographics of students, discussions regarding racial and ethnic considerations within the learning environment occurred only three times and were in reference to peer-to-peer interactions.

Influential Peer Connections. Throughout discussions, multiple participants expressed the joy brought forth through peer friendships. Students recalled experiences of informal social gatherings, such as eating lunch with classmates pre-COVID-19, baking birthday cakes and having birthday parties for each other, and studying together on Zoom during COVID-19. Students also expressed connections to their peers in times of difficulty, such as supporting each other after tough exams, reaching out to each other through difficult match day experiences in the fourth year, and supporting individuals who needed to remediate. Whether recalled experiences with peer interactions were positive or negative, the magnitude of peer influence over individual perception emerged as a central theme. For example, as discovered in the

personal realm of questioning, students often compare their own academic performance with that of their peers, even perhaps internalizing others' failures. While recollections of peer experiences were mostly positive, participants expressed negative perceptions toward the loss of these established peer networks, most notably due to peer attrition.

Loss of Peer Networks through Attrition. Pre-med attrition is a common occurrence in the early undergraduate years, due to unforeseen academic rigor and a myriad of other personal influences. For example, a sample of 15,442 undergraduate pre-med students, across 102 institutions, found that just 16.5% completed the common pre-requisite coursework necessary for U.S. medical school admission (Zhang, et al., 2020). Students in a small combined Baccalaureate-M.D. pathway program may feel a larger impact from these naturally occurring losses, with one M4 recalling the prevalence of the perception of attrition among the student population noting:

"So starting freshman year that was sort of like the joke… I hope I make it through… because a lot of kids would leave or wouldn't make it to their second part of the program… so that was sort of, um, the perception."

The loss of peer networks through attrition creates feelings of loss in the students who remain. An M1 student spoke specifically to the loss of peer networks through attrition by saying:

"I lost a lot of my classmates in the sense that they've sort of like failed out of my year and so as a result, everyone that I used to be close to is no longer around."

Additional participants also referenced these feelings of loss, with one M4 student expressing sentiments of guilt for being able to proceed while others lost their assured pathway to becoming a physician. Along with feelings of loss and guilt, participants also seemingly internalized these experiences, expressing concerns over their own academic futures.

Concerns over Academic Progression. As an outflow of social discussions of peer attrition, participants expressed personal concerns over their own ability to successfully progress in the combined pathway program. As one M2 student said:

"… I know it is medical school and nobody likes to talk about failing, or what happens when you fail… but it's realistic."

Due to strong peer networks formed early on in the program and the intimate nature of Baccalaureate-M.D. programs, any type of normal peer attrition has the ability to act as confirmation bias towards previously established personal fears or imposter syndrome. Imposter syndrome is a personal, psychological phenomenon where individuals feel as if they do not belong in a certain role and it is common among pre-med students during, "professional identity formation" (Peterson et al., 2017, p.102). While the qualitative data suggests that peer interactions may amplify feelings of academic and professional uncertainty, this phenomenon was not present in conversations regarding student-faculty dynamics.

Impactful Faculty Mentoring. In discussions centered on student-faculty interactions, 50% of students reported encounters with responsive faculty and 62.5% of participants recalled positive, impactful experiences with faculty members [See Table 6]. Comments ranged from the naming of specific professors /advisors in association with meaningful moments, to expressed generalizations of faculty helpfulness like the comment made by an M4 student who stated:

"…there have been a lot of faculty that have looked out for my best interests and like looked out for me and kind of know who I am as a person."

These types of comments suggest that the interactions taking place between students and faculty are impactful. Yet, there were no recalled instances of faculty mentoring among M2 participants. This could be an outlier in the data attributable to the small sample size, or it could

be that M2 students, who are in the midst of USMLE Step-1 exam prep, may feel more removed from supportive faculty networks. Despite the absence of faculty mentoring recollections by M2 students, as a collective sample, more students expressed encounters with responsive faculty than unresponsive faculty [See Table 6].

Taken all together, these findings suggest that positive student-faculty relationships exist in the learning environment, but may diminish during the second-year of medical study when students are preparing to take the first step exam in physician licensure. Given earlier findings regarding students' difficulty with testing, the social isolation that occurs during the M2 year should be of particular concern for the organization. These findings warrant future study on the correlation between social isolation, potentially caused by licensing exam preparation, and Y2Q *Student-Faculty Interaction* scale results. Future inquiries may also seek to uncover the exclusive experiences of second-year students, with the purpose of designing additional student support strategies for this specific portion of the student population.

Question 2c) Specifically, what aspects of the organization contribute to positive and negative student perceptions?

Learning environment scales from the Y2Q are not specifically designed to measure positive and negative perceptions of organizational facets of the institution; therefore, qualitative data will once again be used as the primary data source for answering this investigative question. Conversations in this realm of questioning involved administrative responsiveness, the curriculum, organizational mission, grading and evaluation systems, and professional and research-based student opportunities. Throughout these conversations, aspects of the curriculum emerged as a top determinant of positive and or negative perception [See Table 6]. Specific within these discussions were topics of active and passive curriculum delivery, with active delivery methods being associated with positive perceptions and passive curriculum delivery

methods being attributable to more negative sentiments. Despite mixed perceptions on the curriculum, students conveyed deep ties to the organization's mission.

Curriculum Design

Opinions on organizational curriculum design varied, with students both endorsing and criticizing the layout and organization of the curriculum. Students in the pre-clinical years of study appeared more critical of the curriculum, while students in their last year of study were more supportive of the curriculum design. For example, an M1 student suggested a reorganization of the organ systems, while an M4 stated support for the design saying:

"I could not have asked for a better way for the organ systems to be set up… that was exactly the way it should have been. Like in hindsight, when you go back and study for your boards, the M1 and M2 was set up perfectly..."

This discrepancy could suggest that students in the first two years of study may not see the curriculum holistically. These differences in opinion may reflect a need to provide all incoming students with a proactive, longitudinal view of what is ahead in the curriculum and specifically how it relates to licensing exam material. Though students' perceptions of the curriculum design were mixed, a clear delineation between negative passive curriculum delivery experiences and positive active curriculum delivery experiences emerged during discussions.

Passive Learning

For the purposes of this project, passive curriculum delivery is conceptualized as learning activities, which require little-to-no student participation, specifically traditional, one-way lectures. While students made comments on the helpful nature of recorded lectures, the majority of discussions centering on passive learning delivery techniques, most notably one-way lectures, were unfavorable. For example, an M1 student described a negative experience with the lecture environment by saying:

"Pre-COVID I want to say I would attend basically every lecture but most of the time I would be doing something else on my laptop, whether it be doing flashcards or trying to do questions or… getting distracted."

Another M1 student negatively described the passive nature of lectures, stating:

"I feel like a lot of the professors are still lecturing and they're not necessarily allowing us, allowing a conversation to exist between us and them."

Initially, one may attribute these negative perceptions as a normal by-product of transitioning into a more rigorous, lecture-based professional medical curriculum; however, students across multiple years of study echoed sentiments put forth by the above cited first-year students. Students recommended improvements in "*the styles of the lectures,"* while suggesting the need for more interactive PowerPoint lectures, with quizzes and/or animations. Reactions to more active curriculum delivery methods, including traditional lectures that allowed for more two-way communication, were of a more positive nature.

Active Learning

For the purposes of this project, active curriculum delivery methods are conceptualized as approaches to learning that involve active class communication and/or participation. This could be something as unassuming and expansive as question/answer periods during lectures or it could involve more complex activities such as, hands-on demonstrations, case-based, and / or team-based learning. Students described their experiences with active learning saying:

"…Some classes are purely like lecture driven so you kind of just sit there for three hours… other times there were some courses that were super engaging… [because] there's so much participation, the professor themselves were so engaged you kind of feel like you're a part of this which was really nice." - M4

"Teachers who are really, really good, I remember some of them wouldn't even have PowerPoints, or it would be in… office hours when they can go and put you in front of a whiteboard and teach you the actual topic in layman's terms… those are the teachers that I really, really like." – M2

Given earlier findings that students are experiencing personal difficulty with testing and concerns over academic progression, negative experiences with traditional lectures could amplify existing negative perceptions within the organization's learning environment.

Mission Alignment

Additional insight that emerged from discussions on the organizational realm of the institution involve positive perceptions of the organization's mission. Conversations in this realm of questioning revealed strong student ties to the organization's mission to help diversify the physician workforce and replenish primary care providers. Students' unprompted comments on the organization's mission reveal a deep affinity for the school, with students from all three levels of medical education commenting on the school's mission:

"I believe in the school, and I believe in its mission and I know that they are doing their best to make sure that we're doctors and make sure that we are successful."- M1

"I really have to be grateful for the opportunity to [sic] just be at a school where their mission aligns with what I want to do." – M2

"I really just love the school and you know everything it stands for."-M4

Other student participants expressed feelings of joy and contentment with their school selection, as a by-product of mission alignment. These comments suggest that even though student satisfaction may be affected by academic uncertainties and social losses, students at the organization have a connection with the school's mission. Frequent reinforcement of this mission may help offset negative aspects of the learning environment. Taken in conjunction with secondary survey data, the qualitative findings of this project support the reciprocal nature of the personal, social and organizational influence of the learning environment on student satisfaction, as proposed through the project's theoretical and conceptual framework.

Theory of Change

The findings of this project suggest three interdependent conclusions: First, students may struggle personally when adjusting to the self-guided nature of the medical school curriculum. Second, peer attrition in the social realm of the learning environment amplifies personal concerns over academic progression; these concerns are somewhat alleviated by meaningful faculty mentoring experiences and connection with the organization's mission. Finally, inherently passive aspects of the organizational curriculum may agitate existing personal dissatisfaction with the academic experience. Together, these findings inform a theory of change, aimed at decreasing neutral student satisfaction and increasing positive student satisfaction ratings. The Theory of Change is as follows: "*If the organization can build students' personal perceptions of self-efficacy through enhanced academic programming and formalized social networks, then student satisfaction should increase in subsequent evaluations."*

Strategic Recommendations

To realize this goal, it is recommended that the organization engage in two, people-centered, strategic change initiatives to model programs currently in use at other medical schools. First, it is recommended that the organization implement the University of Colorado's School of Medicine's individualized learner assessment system to provide specific study and test-taking strategies to students (Guerrasio, et al., 2017). Second, it is recommended that the organization use The Johns Hopkins School of Medicine's Colleges Program model as a template for strengthening social networks and negating disruptions in the social environment (Stewart, et al., 2007). Tandem use of these recommendations will help improve students' expectations and skills associated with self-study, while providing a platform for student-student and student-faculty social engagement and support.

Recommendation #1: Individualized Learning Assessments

Outside of mismatched expectations, difficulty with testing was the most prominent theme emerging from student interviews. In addition to comments previously presented in this report, students also made statements such as, "*I knew I was struggling but I didn't know how to organize the way that I was studying"* and "*I didn't even know that that was my issue, test-taking. I thought oh you know…maybe I'm just not grasping the content well."* Currently, the organization provides study and test-taking resources to students through a Learning Resource Center (LRC). The center provides optional services such as tutoring, review sessions, and one-on-one faculty coaching and requires LRC guidance for struggling students meeting certain academic criteria (administrator, personal communication, June 3, 2021). Using resources currently in place at the LRC, the organization could institute a proactive academic support plan and conduct mandatory and individualized student learning assessments similar to those originating from residency remediation programs at the University of Colorado, School of Medicine (UCSOM) (Guerrasio, et al., 2019).

Industry Example. Recognizing the unique needs of each learner, UCSOM built a remediation program centered on the educational tenets of "deliberate practice, feedback, reflection, and, finally, a focused reassessment" (Guerrasio, et al., 2014, p. 352). Under this model, learners who fail to satisfy academic expectations meet with faculty advisors and complete a self-evaluation of their own study/test-taking experiences, before receiving an individualized plan of action (Guerrasio, et al., 2017). Out of the 52 undergraduate medical students participating in the program, who had "either failed an exam or scored below the 30th percentile" on an exam, 96.2% passed the exam after participation in the remediation program (Guerrasio, et al., 2017, p. 4). Key to this success is the model's ability to match specific study

strategies to the personal learning struggles of participants. For example, a recommendation they provide for students who say, "*I don't remember what I study*," is to "*create podcasts to teach yourself the material you just read and listen to them on your way to work*" (Guerrasio, et al., 2017, Appendix G). Full text of UCSOM's "Learner Common Problems List," "Suggested Strategies for Medical Learners," and "Faculty Interview Guide" are located in Appendices F-H of this report (Guerrasio, et al., 2017).

Logistics of Implementation. While originally designed to provide remediation to students who failed exams, it is recommended that the organization take proactive and strategic action to implement the UCSOM learning tool early in the student's academic journey. Guerrasio et al., (2017) noted the benefits of such proactive measures stating, "ideally the tool will be implemented months prior to an anticipated standardized exam…" (p. 2). Therefore, ideally the organization should introduce this program through the LRC after the first year of undergraduate study, when students have had an opportunity to acclimate to the rigors of college coursework and may be able to better communicate perceived deficiencies in their studying and / or test-taking skills. Students should then be re-evaluated as they enter the first year of medical school. First-year medical students, who did not receive access to the program during their second year of undergraduate study, should be grandfathered into the process.

Under this model, each student should meet with a learning advisor, take the learning style assessment, and be given specific strategies for increasing information retrieval and enhancing test performance. Students should then participate in follow-up meetings as they initiate new study and test-taking habits. Follow-up appointments should be made throughout each semester of the evaluation year to determine the efficacy of the recommended learning strategy and to determine if any additional environmental/personal stressors, or deficiencies, are

compounding material comprehension. Additional evaluations can then be made upon the learner's request and/or at the request of student support offices. On average, UCSOM found that this process required approximately 10 hours of faculty commitment, per learner (Guerrasio, et al., 2017). If the parent university lacks the resources necessary to implement this evaluation process in the fall of the second year of undergraduate study, then the medical school should work to incorporate these policies exclusively into first-year medical student advising. An expanded logic model of the inputs, outputs, and projected short, medium and long-term outcomes of this endeavor can be found in Appendix E. Despite the new electronic infrastructure and faculty/staff time commitment needed for proper student evaluation and oversight, the implementation of individualized student study and testing assessments should result in increased perceptions of academic self-efficacy among students, leading to lower levels of academic fear and higher levels of student satisfaction.

Recommendation #2: Faculty-Paired Learning Communities

Along with personal academic concerns, ideas regarding influential peer connections and the loss of peer networks through attrition permeated participant discussions. Combined, there were 18 references made to these themes from six out of eight project participants. Additionally, this project found impactful faculty mentoring experiences to be associated with positive student recollections. Throughout discussions, participants provided suggestions for increasing social opportunities in the organization. Two students pointed out the importance of social connections saying, "*getting to interact with the faculty like a little less formally would be cool"* and "…*we have meetings sometimes with the faculty…but it's something that I feel is pretty important, just to develop those relationships with all the faculty and the Deans and so forth and the students."* Currently, students interact with each other and faculty through formal school events such as the

Freshman Picnic and monthly class meetings. Additional peer contact time is available through LRC-monitored peer tutors. However, these interactions are limited and may be most often confined to year-specific student groups. Therefore, it is recommended that the organization expand social offerings by modeling the Colleges Program currently in use at The John Hopkins University School of Medicine (JHUSOM).

Industry Example. Aiming to increase student support, in 2005 JHUSOM divided their medical school classes into specific colleges, or groups, akin to houses in the popular fiction series Harry Potter (Stewart, et al., 2007). Under this program model, faculty are given devoted time to spend with students assigned to their colleges. Faculty provide advising and mentoring services from the first month of the first year of medical school through completion of the fourth year of medical study (Stewart et al., 2007). Over the course of four years, students and their faculty partners engage in athletic competitions against other colleges, while participating in group-specific social gatherings and community events (Stewart et al., 2007). According to JHUSOM, benefits to these pre-defined social and academic support structures include, "dispel[ling] harmful messages embedded within the hidden curriculum," offering "community support at times of transition," and providing "individualized attention from a faculty advisor" (Stewart, et al., 2007, p. 355).

Additional Examples. Prior to the Colleges Program at JHUSOM, in 1999, the University of Iowa's Roy J. and Lucille A. Carver College of Medicine (UICCOM) divided students into Hopkins-like learning communities to bolster social engagement (Rosenbaum, et al., 2007). A 2003 prospective evaluation of student perspectives found that students in these learning communities were able to identify more students in the institution by name and the average perception rating of the learning environment increased among second and fourth-year

students (Rosenbaum et al., 2007). Given these benefits, other medical schools around the country have implemented their own versions of the Harry Potter-inspired academic colleges made prominent by JHUSOM. For example, in 2003 Case Western University School of Medicine implemented their version of these social communities called "Advising Societies" ("Student life," n.d., para 3). In 2019, the University of Minnesota, School of Medicine implemented a pilot version of the Johns Hopkins-style house system ("University of Minnesota…," 2019). Likewise, Emory University School of Medicine also has their own version of these social houses called the "Society System," in which students meet two times a week and participate in active learning opportunities together ("Societies and small group learning," n.d., para 1.). Given that the findings of this investigation revealed positive recollections of student-faculty mentoring experiences and feelings of loss and isolation associated with peer attrition, this type of academic house system could enhance both student-student and student-faculty interactions which are vital to favorable Y2Q survey ratings.

Logistics of Implementation. To implement an academic or social 'house,' it is recommended that the organization divide current students from across years one through four of medical study into five or more distinct academic houses, with at least one, preferably two, faculty mentors associated with each house. This will allow entering M1 students the opportunity to socialize with peers in the M2, M3 and M4 years of study, thus providing increased and diverse social networks for students. Johns Hopkins University named their colleges/houses after notable alumni and the organization could follow this model or simply follow an alphabetical or numerical naming system (Stewart et al., 2007). Once divided, these houses should meet once a month for team-building, mentoring, and/or to engage in social activities such as dinner at a faculty member's house or restaurant, or to attend professional

development activities, such as informal guest lectures. As is held at JHUSOM, a competitive athletic event should also be planned to allow for cross-house competition and social connectedness. As space is a limitation for the organization, meetings outside of the athletic event could take place virtually at no cost to the institution. However, it is recommended that activities be moved to an in-person format as health conditions and budgets allow, to increase feelings of inclusivity and social connectedness.

As with the creation of individualized learning assessments, building a series of internal learning communities will primarily require the allocation of staff and faculty time. A logic model detailing the necessary inputs, outputs and projected short, medium and long-term outcomes of these endeavors has been provided in Appendix E. Given the medical school admission timeline, and need for strategic planning prior to implementation, the creation of an individual learning assessment process and the establishment of social learning communities may be most effectively carried out in the fall of 2022. Following this timeline, evaluations for measuring the effectiveness of the organization's efforts could begin in fall 2023. A sample outcome-based evaluation matrix for these initiatives has been provided in the next section of this report.

An Outcome-Based Evaluation Matrix

Outcome evaluations are useful in measuring the success of organizational change initiatives (Centers for Disease Control and Prevention, 2012). The purpose of the evaluation matrix below is to provide primary stakeholders at the organization with actionable strategies for determining the effectiveness of the suggested improvement efforts. Specifically, the outcome-based evaluation matrix below will help determine whether the creation of an individualized learning assessment program and the establishment of academic learning communities proved effective in producing positive perceptions of the learning environment while ultimately increasing student satisfaction [See Table 8 Below]. School-level executive leaders, and academic and administrative deans can use key findings from these investigations to encourage support for the allocation of additional financial and personnel resources from the parent organization. If long-term findings do not indicate that the strategic initiatives proved successful in improving student satisfaction, this plan may provide insight for altering those processes.

To understand the effectiveness of change efforts, this evaluation seeks to answer four output-driven questions relating to the two suggested change initiatives: 1) Did participation in the individualized learning assessment program produce personal perceptions of academic confidence among students? 2) Did implementation of the program increase Step-1 pass rates among second-year medical students at least one-year after participation? 3) Were students satisfied with the student-student social experiences they had within their academic houses? 4) Were students satisfied with the student-faculty experiences they had within their academic houses? While quantitative outcome assessments from future AAMC Y2Q surveys serve as key lagging indicators of program success, the introduction of new qualitative assessments into the organization's internal evaluation processes will allow students an opportunity to provide

leading, contextual-based feedback to the organization, the benefits of which have been highlighted in this report. As detailed in Table 8 below, the evaluation's design capitalizes on existing organizational infrastructure and is therefore feasible, with minimal additional costs associated with increased faculty time. The mixed methods data produced by these investigations will provide valid and detailed information on students' personal opinions, as well as overall perceptions of the learning environment.

Table 8: Outcome-Based Evaluation Matrix

OUTPUT-DRIVEN EVALUATION QUESTIONS: INDIVIDUALIZED LEARNING ASSESSMENTS	INDICATORS	DATA SOURCE	COLLECTION METHODS	ANALYSIS PROCEDURES
Question 1: Did participation in the individualized learning assessment program produce personal perceptions of academic confidence among students?	**Indicator #1:** Students' perceptions of their study and/or test-taking skills	**Data Source #1:** One-on-one interviews with students who participated in the program for at least one year.	**Methods #1** Leaders within the Office of Student Affairs should conduct 20-minute one-on-one semi-structured virtual interviews with program participants.	**Analysis #1** Confidential transcripts should be provided to the Office of Institutional Research / Effectiveness for evaluation of key themes.
Question 2: Did implementation of the program increase Step-1 pass rates among second-year medical students at least one-year after participation?	**Indicator #1:** Institutional Step-1 Licensing Exam pass rates for participants	**Data Source #1:** Standardized exam scores for second-year medical students participating in the program	**Methods #1** Institutional data provided by the USMLE / Federation of State Medical Boards & National Board of Medical Examiners (Historical and current data)	**Analysis #1** Pass rates for learning assessment participants should be compared to the pass rates of those not participating in the program (Historical data)

OUTPUT-DRIVEN EVALUATION QUESTIONS: FACULTY-PAIRED LEARNING COMMUNITIES	INDICATORS	DATA SOURCE	COLLECTION METHODS	ANALYSIS PROCEDURES
Question 3: Were students satisfied with the student-student social experiences they had within their academic houses?	**Indicator #1:** Student perceptions of student-student social interactions during academic house activities **Indicator #2:** Student's overall satisfaction with student-student interactions within the learning environment.	**Data Source #1:** Interviews detailing stated student experiences with the newly created learning communities, across years M1-M4 of study **Data Source #2:** Y2Q external, electronic survey administered to second-year students through the AAMC	**Methods #1** Leaders within the Office of Student Affairs should conduct 20-minute one-on-one semi-structured virtual interviews **Methods #2:** 2023 AAMC Y2Q Student-Student Interaction scale results and overall satisfaction response percentages	**Analysis #1** Confidential transcripts should be provided to the Office of Institutional Research / Effectiveness for evaluation of key themes **Analysis 2:** A year-over-year analysis compiled by the AAMC will demonstrate an improvement or decline in Student-Student social factors
Question 4: Were students satisfied with the student-faculty experiences they had within their academic houses?	**Indicator #1:** Student perceptions of student-faculty social interactions during academic house activities **Indicator #2:** Student's overall satisfaction with student-faculty interactions within the learning environment.	**Data Source #1:** Interviews detailing stated student experiences with the newly created learning communities, across years M1-M4 of study **Data Source #2:** Y2Q external, electronic survey administered to second-year students through the AAMC	**Methods #1** Leaders within the Office of Student Affairs should conduct 20-minute one-on-one semi-structured virtual interviews **Methods #2:** 2023 AAMC Y2Q Student-Faculty Interaction scale results and overall satisfaction response percentages	**Analysis #1** Confidential transcripts should be provided to the Office of Institutional Research / Effectiveness for evaluation of key themes **Analysis 2:** A year-over-year analysis compiled by the AAMC will demonstrate an improvement or decline in Student-Faculty social factors

Conclusion

The stated experiences of students within the organization featured in this project are not unlike the experiences of students at any other medical school within the United States. Young learners enter these medical training arenas with the hopes of emerging as the newest members of one of society's oldest professions. Along the way, learners often encounter personal, academic difficulties transitioning from the relative ease of undergraduate coursework to the rigors of professional medical education. Compounding these difficulties are unique social and organizational factors within the medical school learning environment, as presented here through the distinct experiences of combined pathway students at one medical school in the Northeast. Participants' comments revealed the interdependent nature of the medical school learning environment, suggesting that progression into the community of practice is as much psychological as it is meritocratic. Yet, much of the existing literature on student satisfaction in the health professions is quantitative in nature and in some ways fails to capture the variable underlying mental constructs associated with the student experience.

The AAMC and the LCME support medical training institutions by providing almost formulaic guidance on ideal learning environment practices, and tools for measuring the effectiveness of those practices. However, variances such as combined pathway students exist within the medical education system and it is important to consider that each organization and student population is susceptible to school-specific cultures. Future lines of inquiry may seek to unearth these variances by implementing additional qualitative investigations aimed at capturing the interdependent day-to-day experiences of students. By taking a people-centered approach to continuous improvement, modern M.D. training programs can increase student satisfaction while continuing to uphold the historical rigors of medical education.

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Appendix A: Race / Ethnicity Responses of U.S. Medical School Matriculants from Application Years 2016-2017 – 2020 -2021, Table A-14.3.

Table A-14.3: Race/Ethnicity Responses (Alone and In Combination) of Matriculants to U.S. Medical Schools, 2016-2017 through 2020-2021

The table below displays the self-identified racial and ethnic characteristics of matriculants to U.S. medical schools from 2016-2017 through 2020-2021. "Alone" indicates those who selected only one race/ethnicity response. "In Combination" indicates those who selected more than one race/ethnicity response. Please email datarequest@aamc.org if you need further assistance or have additional inquiries.

Percent of Matriculant Race/Ethnicity Responses		2016-2017*	2017-2018	2018-2019	2019-2020	2020-2021
American Indian or Alaska Native	Alone	27.8	20.5	17.9	19.1	14.5
	In Combination	72.2	79.5	82.1	80.9	85.5
	Alone or In Combination	0.9	1.0	1.0	1.1	1.1
Asian	Alone	87.4	86.7	87.3	86.3	86.6
	In Combination	12.6	13.3	12.7	13.7	13.4
	Alone or In Combination	24.4	24.2	25.4	24.8	24.9
Black or African American	Alone	84.5	84.8	83.0	84.9	83.5
	In Combination	15.5	15.2	17.0	15.1	16.5
	Alone or In Combination	8.4	8.3	8.6	8.8	9.5
Hispanic, Latino, or of Spanish Origin	Alone	60.6	60.3	58.2	57.3	56.9
	In Combination	39.4	39.7	41.8	42.7	43.1
	Alone or In Combination	10.5	10.8	10.7	11.3	12.0
Native Hawaiian or Other Pacific Islander	Alone	20.0	20.6	30.7	13.7	17.5
	In Combination	80.0	79.4	69.3	86.3	82.5
	Alone or In Combination	0.3	0.3	0.3	0.4	0.4
White	Alone	87.6	87.2	86.4	84.6	83.7
	In Combination	12.4	12.8	13.6	15.4	16.3
	Alone or In Combination	58.8	56.9	57.7	55.1	53.4
Other	Alone	50.7	55.7	52.4	52.9	55.3
	In Combination	49.3	44.3	47.6	47.1	44.7
	Alone or In Combination	3.4	3.3	3.4	3.3	3.8
Unknown Race/Ethnicity		1.6	3.6	1.8	4.9	4.9
Non-U.S. Citizen and Non-Permanent Resident		1.3	1.3	1.3	1.2	1.2
Unduplicated Total Matriculants		*100.0*	*100.0*	*100.0*	*100.0*	*100.0*

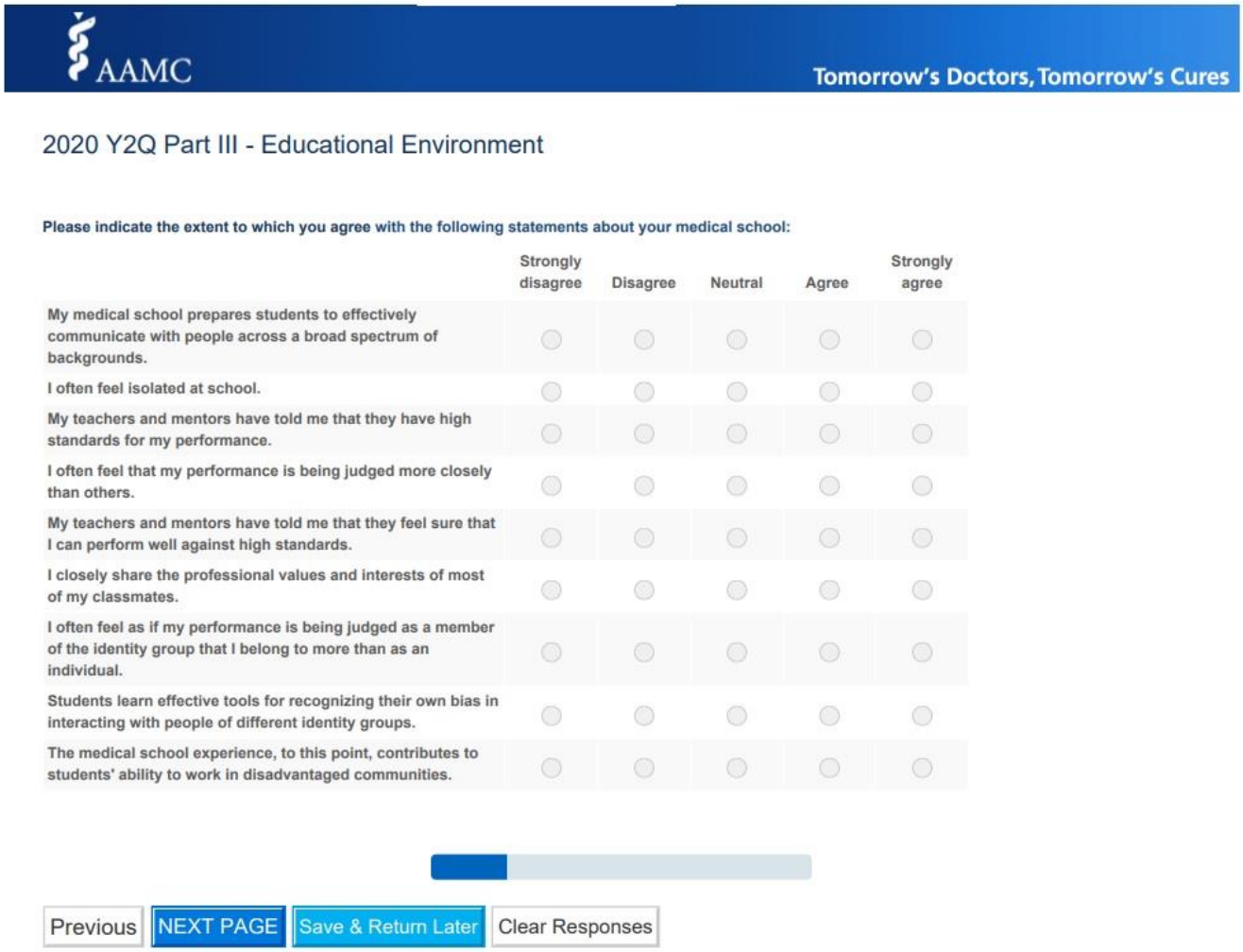
*During the 2016 application cycle, a technical malfunction in the collection of race/ethnicity data necessitated a request that applicants review and re-submit responses to the race/ethnicity question in their AMCAS applications. No applicants were asked to review this question prior to or after 2016.

Notes: The "Non-U.S. Citizen and Non-Permanent Resident" category may include students with unknown citizenship.

Each academic year includes applicants and matriculants that applied to enter medical school in the fall of the given year. For example, academic year 2020-2021 represents the applicants and matriculants that applied to enter medical school during the 2020 application cycle.

(Source: AAMC, 2020b)

Appendix B: Sample questions from the Educational Environment Section of the AAMC's 2020 Y2Q Survey



AAMC

Tomorrow's Doctors, Tomorrow's Cures

2020 Y2Q Part III - Educational Environment

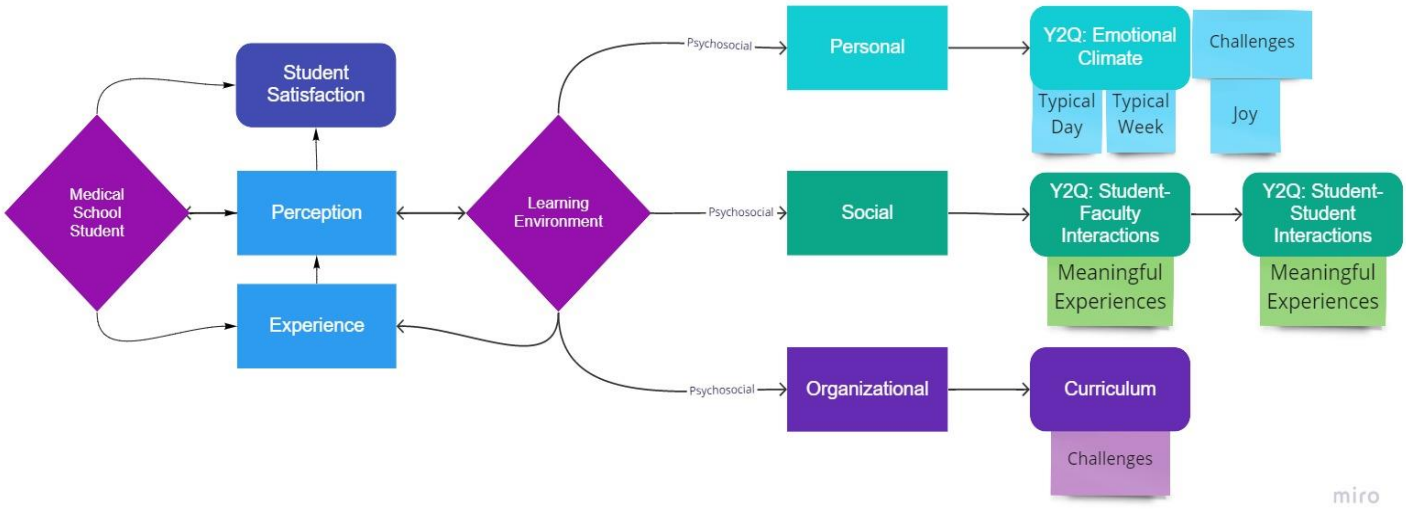
Please indicate the extent to which you agree with the following statements about your medical school:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
My medical school prepares students to effectively communicate with people across a broad spectrum of backgrounds.	○	○	○	○	○
I often feel isolated at school.	○	○	○	○	○
My teachers and mentors have told me that they have high standards for my performance.	○	○	○	○	○
I often feel that my performance is being judged more closely than others.	○	○	○	○	○
My teachers and mentors have told me that they feel sure that I can perform well against high standards.	○	○	○	○	○
I closely share the professional values and interests of most of my classmates.	○	○	○	○	○
I often feel as if my performance is being judged as a member of the identity group that I belong to more than as an individual.	○	○	○	○	○
Students learn effective tools for recognizing their own bias in interacting with people of different identity groups.	○	○	○	○	○
The medical school experience, to this point, contributes to students' ability to work in disadvantaged communities.	○	○	○	○	○

Previous | NEXT PAGE | Save & Return Later | Clear Responses

Source: (AAMC, n.d.a)

Appendix C: Expanded Student Satisfaction Conceptualization & Interview Topics



Appendix D: Thematic Analysis Codebook

CODE/THEME	CATEGORY	DEFINITION	EXAMPLE FROM INTERVIEWS
REALIZED EXPECTATIONS	***Personal***	Anticipations of something manifested; pre-formulated ideas of future events	*"I didn't think that it would be much different from the undergrad portion. I just thought like that everything that we would learn would be more relevant to actual medicine, which was true."*
MISMATCHED EXPECTATIONS	***Personal***	Anticipations of something that never manifested; pre-formulated ideas that were not congruent with unfolding events	*"I was never thinking about like what I'm doing right now, which is spending 10 hours a day, just studying at a desk."*
ACADEMIC FAILURE	***Personal***	Inability to meet academic metrics / benchmarks, such as not passing modules, classes, or licensing exams.	*"I'm having this hard time and I don't know if I'm going to pass."*
ACADEMIC PROGRESSION	***Personal***	Regarding the ability to move through the required levels of study.	*"I know it's Medical School and nobody likes to talk about failing, or what happens when you fail … but it's realistic and it's real."*
TESTING CONSIDERATIONS	***Personal***	Involving class-level exams or standardized examinations	*"It was the first time I took a board exam that big since the SATs. And so I had no, I didn't take the MCAT, so I didn't have that sort of prep mind in my belt."*
SELF-STUDY TECHNIQUES	***Personal***	Strategies for studying on one's own, outside of the classroom	*"Pre covid I want to say I would attend basically every lecture. But most of the time I would be doing something else on my laptop, whether it be doing flashcards or trying to do questions or something."*
ACADEMIC SUCCESS	***Personal***	Meeting academic metrics/benchmarks, such as passing modules, classes, or licensing exams.	*"I've been quite astonished at my ability to learn new things consistently every year every exam every module. And I feel like that really genuinely brings me joy"*
ISOLATION	***Personal***	Being on one's own; not connected to social networks	*"If you get out of that original class that you come in with it just feels like you're by yourself."*
OVERALL MENTAL HEALTH	***Personal***	Psychological well-being	*"And it helps a lot for mental health to know like oh everyone feels this way about this particular thing it's not just me freaking out, and I will be okay, as a doctor."*
STRESS / ANXIETY	***Personal***	Instances of pressure or mental angst	*"It was still a very stressful time, I would say, and compared to like my other friends that were in an undergrad I felt like you know, I was oftentimes like constantly doing work."*
BURNOUT	***Personal***	Mental angst due specifically to repetitive demands	*"A lot of people who are talking about it now at least to me have increased and I know like Medical School burnout is real."*

FACULTY MENTORING	***Social***	Supporting students outside of the classroom. May also involve instances of faculty inspiring students to formulate a new physician identity.	*"I think there have been a lot of faculty that have looked out for my best interests and like looked out for me and kind of know who, I am as a person."*
PEER NETWORKS	***Social***	The social relationships of students within the BS/M.D. program.	*"You know from day one from the time I came to the interview and saw how everyone's interacting with each other, I really liked that, and I believe it's because we had such a small group of people who are really willing to help each other and encourage each other."*
LOSS OF PEER NETWORKS	***Social***	A loss of social connections due to delayed years, or a student's removal from the academic program.	*"I lost a lot of my classmates in the sense that they've sort of like failed out of my year. And so, as a result, everyone that I used to be close to is no longer around."*
RESPONSIVE FACULTY	***Social***	Faculty who are accessible, and provide timely communications	*"I would say M1 / M2 faculty were definitely responsive. There usually weren't any issues that really came up in my class or with me. But if there is anything they emailed back promptly."*
UNRESPONSIVE FACULTY	***Social***	Faculty who are inaccessible and provide untimely communications.	*"I feel like some faculty members aren't necessarily the best at getting back to students… I know some people have like you know issues with technology or like have issues with emails, but I feel like sometimes it becomes so normal that I kind of don't expect an email back."*
ISSUES OF RACE / ETHNICITY	***Social***	Topics involving one's own race/ethnicity or the race/ethnicity of others.	"…ethnic students usually sit on one side [of the classroom], usually with their own groups."
MISSION ALIGNMENT	***Organizational***	A connectedness to the aim the institution strives to achieve.	*"I really have to be grateful for the opportunity to just be at a school where their mission aligns with what I want to do."*
ACTIVE CURRICULUM DELIVERY	***Organizational***	Learning methods that involve active participation, such as question/answer periods, hands-on demonstrations, case-based, and/or group learning.	*"But the professors who do like Case examples during their lectures ask questions or like have like their poll everywhere, or some type of multiple choice on the zoom presentation, I feel like those ones I've really felt a lot more comfortable with."*
PASSIVE CURRICULUM DELIVERY	***Organizational***	Learning methods that require little to no student participation, i.e. lectures.	*"I feel like a lot of the professors are still lecturing and they're not necessarily allowing us, allowing a conversation to exist between us and them."*
CURRICULUM DESIGN	***Organizational***	Involving the organization and delivery of learning objectives.	"It could have been coincidence but... Like in hindsight, when you go back and study for your boards, the M1 and M2 was absolutely set up perfectly, the amount of weeks, they dedicated for every subject was perfect."

RESPONSIVE ADMINISTRATION	***Organizational***	Institutional leaders' demonstrated willingness to act on student input.	*"When it comes to considering our feedback and making changes when it's something significant, they're pretty good at that."*
UNRESPONSIVE ADMINISTRATION	***Organizational***	Institutional leaders' demonstrated unwillingness to act on student input.	"I feel like we've expressed …like hey maybe we could combine emails and maybe less emails. I don't think it was really heard."
GRADING / EVALUATION SYSTEMS	***Organizational***	Academic evaluations, such as class grades, test grades and licensing exam scores.	"The importance of grades and certain averages on progressing through the Program is very much, in my opinion, unhealthy."
PROFESSIONAL AND/OR RESEARCH OPPORTUNITIES	***Organizational***	Student affordances in the way of extracurricular or research activities	*"I believe that the school definitely does have its limitations. It's not you know, a research powerhouse..."*

Appendix E: Theory of Change Logic Model

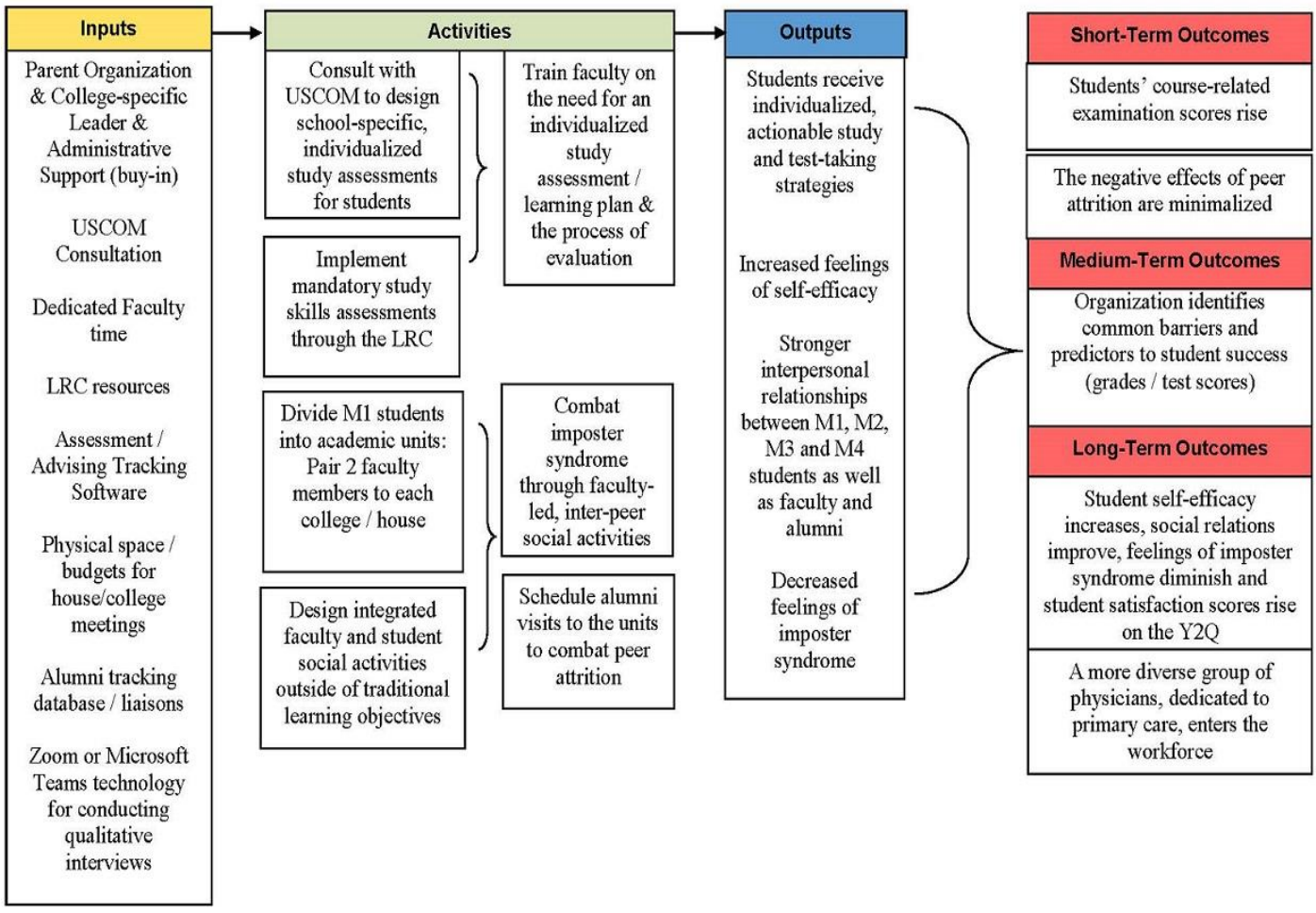
Problem of Practice: Despite institutional efforts to create and foster a supportive learning environment, quantitative assessments have returned higher than anticipated neutral student satisfaction results.

Theory of Change: If the organization can build students'personal perceptions of self-efficacy, through enhanced academic programming and formalized social networks, then student satisfaction should increase in subsequent evaluations.

AIM: Decrease the percentage of neutral satisfaction responses to overall satisfaction on the 2023 Y2Q while increasing the number of "agree / strongly agree" responses.

Recommendation 1: Implement individualized study skills / test-taking strategies, ideally beginning in the U2 year of study

Recommendation 2: Design faculty-paired learning communities for use across M1-M4



Logic Model Assumption 1: Students will apply the strategies formulated in their learning assessments.
Logic Model Assumption 2: Students will have positive experiences in the learning communities.

Appendix F: University of Colorado School of Medicine's "Learner Common Problems List"

(taken from: Guerrasio, J., Nogar, C., Rustici, M., Lay, C., & Corral, J., 2017, Appendix A)

Appendix A. Reported concerns and observations of medical learners who had failed a standardized exam.

Common Problems
1. I am not sure how many resources to use while I am studying.
2. I don't know how many practice questions to do before the exam.
3. I'm too tired to study.
4. I don't remember what I study.
5. There is too much material to learn.
6. I am easily distracted.
7. I'm too busy to spend hours studying.
8. I have trouble making a study schedule.
9. I have trouble following a study schedule.
10. I prefer to learn by listening.
11. I prefer to learn by doing a task rather than just reading about it.
12. I think I would do better if I could take a review course.
13. I can narrow the answer down to 2 choices… and then I pick the wrong answer.
14. Other than reading the explanation, I don't know what to do when I get a practice question wrong.
15. I can't decide where I should study.
16. I should be studying for my upcoming exam, but I really have to pass the test I just failed.
17. I have always been a bad test taker
18. I performed well on medical school exams, but have always done poorly on standardized exams.
19. I scored fine on exams until…
20. The grading histogram from the failed exam (if available) shows that I score poorly on all topics and sections.
21. The grading histogram from the failed exam (if available) shows I score well on some topics and poorly on others.
22. I always score well on certain blocks (e.g. I score well on the first block then fade; I'm a slow starter but do great on the last blocks)
23. I would do better if I have enough time to finish the questions on the test.
24. I'm very anxious about taking the exam again.

Appendix G: University of Colorado School of Medicine's

"Suggested Strategies for Medical Learners"

(taken from: Guerrasio, J., Nogar, C., Rustici, M., Lay, C., & Corral, J., 2017, Appendix B)

Appendix B. Suggested strategies to address reported concerns and observed struggles.[1-9]

Concern	Strategy
1. I am not sure how many resources to use while I am studying.	• Use one or two resources maximum with a bank of questions and learn them well. Avoid having so many study materials that you don't learn any of them well. • If you are unsure which study materials you should use, ask your course director, chiefs, senior residents, or program director. There will likely be a consensus. They may also know where to find discounted items or even lend you study material. Outdated editions are not recommended. • For standardized exams, any information in journal articles that has been published in the past year will either not be on the exam, or if the new material results in changes to an old question, that question will likely not be counted.
2. I don't know how many practice questions to do before the exam.	• If you are planning on reading a review series and completing practice questions, the recommendation is a minimum of 1500 practice questions before a standardized exam. If you are planning on doing questions only, the recommendation is that you complete 2500 practice questions prior to the exam. This assumes that for each question you do not know well or get incorrect, that you go back and review the answer, explanation and review material to ensure understanding of the topic. • For many of the subspecialties, it may be difficult to find more than a few hundred practice questions. As you read consider asking yourself, how would a test question ask me about this material? Consider making up questions or pairing with another fellow and writing questions for each other. Also, ask your program director as they may have stock piled questions that you can use to practice. Additional questions can be found by using the general specialties question bank. For example, if you are a pediatric gastroenterology fellow, complete all of the practice gastroenterology questions in a general pediatric question bank.
3. I'm too tired to study.	• The more active the learning process, the more likely you are to stay mentally engaged and awake (that includes no day dreaming). Write. Diagram. Draw. Build algorithms. Color code your notes. Create a notebook or flashcards in which you: o Record information that you read, but do not know well… so that you can review the material again. Take the time, in the moment to understand the information, then record it in a way that will help you remember. o Record facts that you will have to sit down and memorize. o In the same notebook or on flashcards, record the ONE key point of each question that you get wrong or are unsure of. While the cases in questions change and the phrasing of the question, the key points remain consistent and are often repeated multiple times within the same exam. o Once you finish going through your review material, you can then just study from this notebook or flashcards. This will help

	eliminate redundancy in studying, as too often learners keep going back to the same text re-reading what they do know to find what they need to review again. You can go back and review this book or flashcards a few times before the exam. Some trainees will even rewrite this notebook whittling it down to smaller books, as they study and master the content. They are then left with only a few pages to review the night before the test. o The goal is to revisit the material that you don't know 4-5 times. • If you might have a sleep disorder… seek a diagnosis and treat it. Physicians are notoriously bad at taking care of themselves. The consequences of a failed exam or being placed on probation for poor medical knowledge during training are catastrophic and even more tragic if preventable with treatment.
4. I don't remember what I study.	• To remember what you have studied, you will need to revisit the information > 6 hours after you review it and ideally after a good night's sleep (again, at least 6 hours). • There are many ways to revisit the material without taking too much extra time out of your day. o Teach someone what you just learned (residents, students, etc). You will learn and they will rate you higher for having taken the time to teach. o Recite what you learned as you are commuting to work, walking the dog, telling your significant other about your day. Be as detailed as possible… not I read about heart failure, but I learned that x medicines affect mortality for patient with heart failure and x medications only affect quality of life but do not extend survival. o Recite from memory your latest entry into your study notebook from the prior study session. On Tuesday when you sit down to study, first ask yourself the key points that you wrote in your notebook on Monday evening, or even from Sunday evening. If this feels a little hard, it is probably helping where if it feels too easy, it is likely to be remembered long-term. o Bring in practice board questions as a learning exercise for residents/students. They will really appreciate the teaching and again, you will receive higher ratings from your learners. o Create pod casts to teach yourself the material you just read and listen to them on your way to work. >>Identify a few people that you feel are engaged and interested in board questions (there are many nerds among us). Bring them questions that you are struggling to understand or questions where the answer seems different than clinical practice. It will help you retain the key points. o Compare patient cases with the material that you are studying. o Quiz yourself with the flashcards that you have made at the start of each study session. • Most learners spend all of their time studying, without taking time too *recall* what they have learned… resulting in a lot of wasted time studying with little retention of material.
5. There is too much material to learn.	• When studying for course exams, many students feel like there is too much information to learn. • Prior to attending a class, pre-read all of the lecture material (if available) so that during the class instead of trying to write down everything the professor says, you can work on understanding the content and taking more

	selective notes. The notes taken during lectures should be on concepts and key points, rather than everything. • Instead of trying to learn everything from each lecture, start by reviewing the course objectives. Spend your time and energy learning the objectives, then concentrating on material that the lecturer repeats and/or provides examples. These will be your highest yield topics.
6. I am easily distracted.	• If you have ADHD or might have challenges with concentration… seek a diagnosis and treat it. Physicians are notoriously bad at taking care of themselves. The consequences of a failed exam or being placed on probation for poor medical knowledge during trainee are catastrophic and even more tragic if preventable with treatment. • If you don't have ADHD, but still find yourself easily distracted see strategies for #3 which provides tips for active learning.
7. I'm too busy to spend hours studying.	• Quality over quantity. You don't need to spend 2 hours a day studying or every day off studying for 4 hours. Looking up the answer to just 1 question per day creates a wealth of accumulated knowledge. • For courses with larger amounts of information to be learned, especially in the preclinical years, start by reviewing the course and each lecture's objectives. • Read about one finite topic per day. i.e. Do not read about "HIV tonight." Instead, read about acute presentation of HIV, or prophylaxis for patients with HIV, or neurology complications and opportunistic infections in HIV. • Record information that you read, but do not know well… that you will need to review again. Once you finish going through your review material, you can then just study from this notebook. This will help prevent you from spending too much time on information that you already know, leaving time and energy to spend on what you have yet to learn. You can go back and review this book of "highlights" a few times before the exam (see #3). • Practice the recall techniques in the section "I don't remember what I study." (see #4)
8. I have trouble making a study schedule.	• Sit down with someone who can help you create a study schedule. It can be someone from your program administration, a peer or even a non-medical friend. • Ideally, you will want to begin studying at least one year prior to the major standardized exam. (The board certification exams are harder than the USMLE Steps. Don't be surprised!) Divide the number of topics that you need to review by the number of months or rotation that you have before the exam. Try to match the subjects with your rotation schedule. If you are studying cardiology during your cardiology elective, you will remember more and also have faculty available to answer questions as they arise. Likewise, complete the practice questions for each topic each month as they correspond to your reading. • Study the highest yield topics, meaning those most frequently tested on your exam as noted on the exam website, earlier rather than later. Spend proportionally more time on higher yield topics. • Be sure to build some vacation time into your schedule.
9. I have trouble following a study schedule.	• Find a method for keeping you accountable to your study schedule… set deadlines and create rewards. • Some learners set a goal of 5 questions per day and track their progress on a calendar or spreadsheet for accountability. If they only complete 2 questions on Monday then they must complete 8 on Tuesday.

	• Some ask their program administration or a friend to monitor their studying by voluntarily handing in answers to practice questions. Others tell their rotation attendings and report out on their progress each week. Try not to rely on your significant other as that might create relationship stress. • Some trainees set up a self-reward system to help motivate them to study. If I complete the chapter on post-operative infections and 50 questions, I can go hiking next weekend, get a massage, or I will buy myself new music, a piece of jewelry, new skis etc.
10. I prefer to learn by listening.	• After you read a chapter or set of topics, create a podcast (or other audio recording) in which you teach yourself the material that you just read. Then listen to the audio recording. Many learners choose to listen on their way to and from work, but this will depend on how you commute. • Consider using audio review courses. Listening alone is not enough, but it may help build a foundation for more active studying. (See #3)
11. I prefer to learn by doing a task rather than just reading about it.	• Writing is the equivalent of "doing" while studying. Write. Diagram. Draw. Build algorithms. Color code your notes. Compare and contrast information as you take notes. See #3. • Writing alone is not enough, but it may help build a foundation for other forms of studying, including listening, applying and recalling the information. • Consider exploring the work of Allen Mullen (mullenmemory.com) about how to build memory palaces to retain information. This will help with memorizing, but not necessarily understanding.
12. I think I would do better if I could take a review course.	• Talk to your program director or Student Affairs office about taking a course. Depending on the program and the number of similar requests, your program may be able to accommodate this request and assist with defraying the cost. • If you do attend a course, you will want to complete all of your exam studying prior to the course. Review your review material and complete at least 1200 questions before the course. It is impossible to learn years of information in a single course. Use the course as a review only to help refresh your memory and provide an opportunity to ask any final questions that you might have. Take the actual exam immediately after the review course, or as close to the end of the course as possible.
13. I can narrow the answer down to 2 choices… and then I pick the wrong answer.	• If you are able to narrow the answer choices down to 2 (and the correct answer is among the 2), and then are unable to choose the correct answer, you lack specificity of knowledge. Your general, intuitive knowledge that you use to practice medicine may be fine. However, they are testing the details. Look for the differences in the details between the two answer choices. That is the key teaching point for you for that particular practice question. • Then ask yourself, "how would they have written the question for my incorrect choice to be correct?" e.g. they would have had to tell me that the patient was having fevers for that answer to be correct, since they didn't the other answer is a better choice. • Never give up! Even if you can eliminate one answer choice your odds of getting the question correct increases.
14. Other than reading the explanation, I don't know what to do when I get a practice question wrong.	• Ask yourself, "What is the question really asking?" • Did you make any assumptions? If the information is not in the question stem, then you don't need it to answer the question. Remember, the cases on the exam will most likely be based on typical presentations. i.e. if you

	think the answer is Turner's syndrome, then the stem must tell you that the patient is female short statured with a web neck and shield chest. • If you get a question wrong while you are studying, ask yourself how would they have written the question for my incorrect choice to be correct? (i.e. in order for "*s. pneumoniae*" to be correct, they would have to tell us that the patient was febrile and has focal rales, egophony or an infiltrate on the chest xray. They did not so the answer must be "a. COPD exacerbation") • Did you compare the answer choices to the question or to the other choices? Always compare back to the question and stem. • If the images are blurry, don't panic. Questions with images can usually be answered by reading the stem alone. The image is likely bonus information to support your answer. • The test writers want to make sure that you are safe to practice. Focus on red flags, critical clinical decision points and even ask yourself, does the answer choice affect patient outcome? • For questions missed, did you not know the information? Organize the information incorrectly? Not spend enough time on the question? Misread the question? Forget to read all of the answer choices? Get discouraged and invest less effort in the question? Is there a maladaptive pattern that you can work on breaking?
15. I can't decide where I should study.	• Take practice tests and complete practice questions in an environment that simulates the testing environment. Many learners like coffee houses because there is minimal background noise and few people moving around, similar to testing environments. Don't let friends or music at the coffee house distract you or choose another coffee house.
16. I should be studying for my upcoming exam, but I really have to pass the test I just failed.	• If you are struggling to pass an exam, trying to master two body's of knowledge (i.e. cardiology and internal medicine) at the same time, is a recipe for failure. • Talk to your course or program director and let them know your predicament. They are equally invested in you passing the first exam, otherwise you will likely not be eligible to take the fellowship or subsequent exams. • Let them help you decide when to retake exams. Let them know that you will need time (likely months to a year) to re-study for the failed exam. This may mean a low score on your in-training exam. After you complete the failed exam, assure your faculty that you will rededicate your study efforts to their program or course.
17. I have always been a bad test taker	• Don't give up. You are not destined to always be a bad test taker. Take time to read through all of the ways in which you may be struggling. Expect that you will need to study more than your peers to do as well as them on exams, that you will need to complete more practice questions before taking an exam. • Make sure that you are not trying to merely memorize all of the content, but that you understand the information and how it fits into the larger context of your specialty. i.e. Instead of memorizing that chronic pulmonary obstructive disease results in hypoxemia and hypercapnea and asthma does not. Learn that COPD results in impairment by inflammatory narrowing of the small airways as in asthma, but also by proteolytic digestion of actual lung tissue adjacent to these lung areas. It is this loss of alveoli surface area that results in poor gas exchange, unique to COPD. Instead of memorizing that the treatment for Langerhans histiocytosis is smoking cessation, learn that Langerhans histiocytosis is one of three smoking related interstitial

	lung diseases, along with respiratory bronchiolitis interstitial lung disease(RSILD) and desquamative interstitial pneumonia(DIP), all of which are treated with smoking cessation. DIP can be differentiated from the others by the thin wall cysts and nodules found in the upper lobes on CT scan. • Work on questions with a teacher who can watch you work through questions aloud and help you identify challenges…Do you get distracted? Do you key in on the most valuable information? Do you lose this train of thought and have to go back and reread? There is no data to globally suggest that reading the question or the answers before the stem is more helpful, though this works well for some individuals if they maintain a consistent process.
18. I performed well on medical school exams, but have always done poorly on standardized exams.	• Many questions on medical school exams were one-step questions. When completing questions on standardized exams, most questions have two steps. The question may present a case, but instead of asking for the diagnosis, the question asks for the best treatment or the best next step. i.e. A 45 yo previously healthy female presents to your office with squeezing chest pain associated with difficulty swallowing and occasional regurgitation. A barium swallow shows a "corkscrew" esophagus. What is the best treatment? • When completing practice questions, be sure to identify both the answer and the missing unwritten step. i.e. The unwritten step in this case is the diagnosis of esophageal spasm.
19. I scored fine on exams until…	• When? Try to identify the specific time that your exam scores dropped. o The most common reason for this is that you changed the way you study. What methods worked in the past that you have stopped using? Perhaps you took notes as you studied or met with peers in study groups. Can you re-adopt those methods that allowed you to succeed? If your schedule doesn't allow for the same type of studying see #6 for more strategies. o The second most common reason is distraction. o Sometimes the distraction is external. A new baby or expectations of family members or old friends. Communication is the best way to create space among the distractions to allow time for studying. i.e. A resident stopped studying when his son was born. He felt guilty that he was not more available to help his wife, so he stopped studying (and starting arriving late to work) so that he could help her more in the mornings. After he failed his in-training exam, he sat down with his wife to explain that he needed space to study. During this conversation, he learned that she didn't expect him to be available in the mornings and that she could easily manage in the mornings by herself. She anticipated that he would not be as available until residency was finished. o Sometimes however the distraction is internal. Residency is challenging, isolating and at times overwhelming. Residents and fellows frequently experience depression, anxiety, and sadness that can both be distracting to learning and make one less motivated to sit down and study at the end of a long

	day. Strongly consider seeking treatment. Residents and fellows actively and frequently seek mental health help throughout training. Depression and anxiety can prevent trainees from learning. If you are not learning despite long hours in the clinical world and hours studying, seek help. Otherwise you will be wasting huge amounts of time and quickly get burned out. o Occasionally, trainees experience an event, such as a car accident, skiing accident or bout with meningitis that change the way they think. If anything has changed the way you process information, then you will also need to dramatically change the way that you study. If you are not learning despite long hours in the clinical world and hours studying, seek help as you may need formal neuropsychiatric testing to establish how you process information and the best methods for learning.
20. The grading histogram from the failed exam (if available) shows that I score poorly on all topics and sections.	• You need to acquire better test taking skills. • Get to know the test – How long is it and how will you need to manage your test? How many questions? How many sections? How many questions per session? How much time per section? Which topics are of highest yield? You will need to learn all topics, but this will help you prioritize your study time. If 20% of the exam is pulmonary, then it should account for 20% of your study time. • Take practice tests and complete practice questions in an environment that simulates the testing environment. The practice tests should mimic sections the exam, in terms of time allotted, number of questions, variety of questions, and difficulty of questions. • Do not rush through a question, but if it is taking more than 2 minutes, move on. • During the final 1 minute of the time period, fill in answers to the unanswered questions. • Have a consistent approach to answering questions. i.e. Read the question at the end of the passage first, then go back and read through the body of the question, consider an answer and then read the answer choices. • Try looking at questions from both the big picture view and the detailed view. • If you do not have difficulty finishing tests on time: practice questions in smaller blocks (1-5) then check your answers. Smaller blocks reinforce content. • If you have trouble finishing tests on time: you will want to practice larger blocks of questions where you time yourself to help establish and improve upon your pace. Keep track of how long it takes to complete a certain number of questions. Practice managing the clock during the exam. • Practice rephrasing questions, explaining why the given answer is correct and the incorrect answers are wrong. Once you understand the question, go back and identify the key words in the question stem. • For questions missed, did you not know the information? Organize the information incorrectly? Not spend enough time on the question? Misread the question? Forget to read all of the answer choices? Get discouraged and invest less effort in the question? Is there a maladaptive pattern that you can work on breaking? Think about what someone in your specialty

	needs to know. Of note, the people that write board exams want to ensure that you are safe to practice. • Also try asking yourself, if that is the answer, what must be in the question stem? i.e. If the answer is Turner's Syndrome, the case must say a small statured female… otherwise, that isn't the answer. Be sure to synthesize information as you are reading questions. i.e. read 180/90 not as numbers but as "very hypertensive," read right knee pain as unilateral large joint arthralgia.
21. The grading histogram from the failed exam (if available) shows I score well on some topics and poorly on others.	• This indicates that you have the necessary test taking skills to do well, but that you need more time learning specific content areas. Make a list of the content areas that you struggled with and then list out the content areas that you did well on. • Why did you do well on those specific sections? Had you just read about them? Then you will need to spend more time reading about the topics and doing practice questions. Did they correspond to clinical rotations that you have completed? Then try to choose electives in the content areas that you did not do as well on. • Did you perform worse on topics that you studied months ago and better on topics that you have studied recently? As you are studying, keep a notebook or flashcards where you record all of the information that you do not know, that you still need to learn. Then before the exam review this notebook/flashcards, reminding you of the content that you reviewed months ago. See #3. • Another tip is to be sure to learn the "red flags" for your specialty. i.e. When does a person with gastroesophageal reflux need an esophagogastroduodenoscopy(EGD)? What are the red flag symptoms? The examiners want you to be safe to practice.
22. I always score well on certain blocks (e.g. I score well on the first block then fade; I'm a slow starter but do great on the last blocks)	• If you have failed or performed poorly on an exam, it may be helpful to ask about general patterns on exams. Some learners score better on earlier versus later blocks while others do well at the beginning of each block, others do better at the end. • If you are a slow starter, than you may need to do a few practice questions before the exam starts to get your mind in the game. Slow starters also tend to do better with shorter breaks so as not to lose momentum. Also, if you have time at the end of a section, go back and retake the first 3-5 questions as you were just getting warmed up and may need to reconsider those answers. • If you fade fast, you will want to test out a variety of techniques while studying to best prepare you for the test day. At least 3 months prior to the exam, complete long blocks of practice test questions, with several in a row, as would best simulate the real exam. i.e. 40 question blocks, completing 4 blocks in a row. During these test simulations, practice techniques for maintaining your energy through the test by experimenting with eating a snack (low carb/high protein), caffeine, exercising between blocks (running, stretching, stair climbing), listening to music, etc.
23. I would do better if I have enough time to finish the questions on the test.	• Have a consistent approach to answering questions. i.e. Read the question at the end of the passage first, then go back and read through the body of the question, consider an answer and then read the answer choices. • Be sure to synthesize information as you are reading questions: read 180/90 not as numbers but as "very hypertensive" • If you have trouble finishing tests on time: you will want to practice larger blocks of questions (40-50) where you time yourself to help establish your

	pace. Keep track of how long it takes to complete a certain number of questions. Are you getting faster with each block? • Learn to manage the clock during the exam. How often do you look at the clock? Is it helping you move through the questions or taking up too much time? Decide how long you should spend on 10 questions, and by what time you want to have them answered. Look at the clock after every 10 questions or if you think a question is taking too long. How much time do you have left to finish the 10 questions or that block of the exam? Get comfortable looking at the clock quickly and making a quick decision based on how much time has passed. • Repetition leads to efficiency, especially if English is not your first language. If after completing 1000 practice questions, timed in larger blocks, you are still struggling to finish on time. You will likely benefit from talking to a remediation or learning specialist. • Work on questions with a teacher who can watch you work through questions aloud and help you identify challenges…Do you get distracted? Do you key in on the most valuable information? Do you lose this train of thought and have to go back and reread? Do you become paralyzed just before you choose an answer?
24. I'm very anxious about taking the exam again.	• Watch the TED talk by Amy Cuddy on power poses and try it before the exam. • Make sure that when you are seated and taking the exam that you are leaning forward in to the exam. You have got this! It doesn't have you. • If your anxiety is paralyzing, strongly consider seeking treatment. Students, residents and fellows actively and frequently seek mental health help throughout training, including for exams. • Practice meditation or positive affirmation exercises.

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Appendix H: University of Colorado School of Medicine's

"Interview Guide for Faculty Coaches"

(taken from: Guerrasio, J., Nogar, C., Rustici, M., Lay, C., & Corral, J., 2017, Appendix C)

Appendix C. Interview guide for faculty coaches

Introductions

1. Introduce yourself and your role, including any potential or perceived conflicts of interest

2. Ask the learner to introduce themselves and begin to get to know them. This lets the learner know that you are interested and invested in them as a person. It also begins to create a safe space for you to work together. (e.g. Where are you from? What do you enjoy doing? What are your career aspirations?)

Explore Prior Experience and Test Performance

1. Ask the learner about
    a. Prior standardized test performance
        i. If a learner has done well on standardized tests before, they likely have the needed test taking skills and foundational study habits. Their study habits may need to be adjusted to the new content or changed based on available time. For example, blocks of time available for studying are not present in residency as they were in medical school. Many of these learners need to be reminded to go back to strategies that have worked in the past, but that were abandoned.
        ii. If a learner has not done well on standardized test before, they will need more foundation skill development.
    b. If their primary language is different from the language of the exam (i.e. learned English as a second language)
        i. Learners who speak English as a second language are more likely to struggle with completing exams on time, as they may have a slower reading rate. This also impacts the efficiency of studying.
    c. Study resources used prior to the failed exam
        i. Some learners use too many resources. Others use incorrect resources that are either too simplified or too broad. It may be helpful to understand why the learner isn't using the recommended resources.
    d. How much time the learner spends studying, did they get through all of the material and how many practice questions were completed prior to exam failure?
        i. Students perception of expectations is widely variable. This question helps the coach know if the student understands the expectations. It may also reveal unexpected barriers to learning, such as family obligation or a sleep disorder.
    e. Review histograms (if available) from prior exam failures or practice exams
        i. Students who have a variable performance based on topic (i.e. failed renal but pass cardiology) tend to have the necessary test taking skills. Instead they need to focus on missed content.
        ii. Learners who perform poorly across the histogram need more global study and test taking skill development.
    f. Any unusual or unexpected events that may have impacted test performance
        i. Open ended questions give the learners a chance to divulge unexpected challenges that can be addressed.