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A Case Study Investigating the Strategies Used by Preclinical Osteopathic Medical Students to Successfully Transition to Their Clinical Years

Natacha Villedrouin
Nova Southeastern University, villedrouin1@gmail.com

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by
Natacha Villedrouin

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Approval Page

This applied dissertation was submitted by Natacha Villedrouin under the direction of the persons listed below. It was submitted to the Abraham S. Fischler College of Education and School of Criminal Justice and approved in partial fulfillment of the requirements for the degree of Doctor of Education at Nova Southeastern University.

Vanaja Nethi, PhD
Committee Chair

Katrina Pann, PhD
Committee Member

Kimberly Durham, PsyD
Dean

Statement of Original Work

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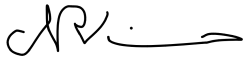

Name

April 24, 2023

Date

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Abstract

A Case Study Investigating the Strategies Used by Preclinical Osteopathic Medical Students to Successfully Transition to Their Clinical Years. Natacha Villedrouin, 2023: Applied Dissertation, Nova Southeastern University, Abraham S. Fischler College of Education and School of Criminal Justice. Keywords: osteopathic medical students, challenges in medical school, preclinical years, time management, strategies of success

Osteopathic medical students experience academic challenges during their preclinical years of medical school due to the rigorous medical school curriculum. Prior research identified several challenges experienced by these students and the need to explore resilience strategies which can be employed to address those challenges.

The purpose of this qualitative case study was to identify and describe the specific strategies used by osteopathic medical students to navigate the academic and personal challenges faced during their preclinical years to persist and successfully transition into the clinical years of the medical program in a large medical school in South Florida. There is a need for administrators to ensure that medical students receive the necessary training, which builds their confidence and prepares them to provide adequate healthcare services, and which meets the needs of future healthcare workforce demands. Exploring the needs of this population of osteopathic medical students would help medical school programs determine the most effective interventions and programs which support the student experience and overall retention efforts.

Two theoretical frameworks will underpin this study, the theory of self-efficacy and attribution theory. The following central research question will guide this study: How do students in their preclinical years navigate challenges and successfully transition into their clinical years, in an osteopathic medical program at a private university in Florida?

This qualitative study was conducted using a descriptive analysis. Participants were interviewed via Zoom. The student consisted of 57 online questionnaire participants and six interviewed participants from the college of osteopathic medicine in Florida. The analysis revealed six themes: (a) self-efficacy as a means to achieve, (b) help matters, (c) plan to succeed, (d) understanding your needs, (e) help at the right time, (f) navigating unexpected challenges.

The results of the study may be useful for the medical school stakeholders such as faculty, staff, administration, and clinicians who work with the students to understand the support students need and how to best advise them. The incoming osteopathic medical students may also find this study to be helpful.

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Chapter 1: Introduction

Pioneered by medical physician Andrew Still in the late 1800's, osteopathic medicine is a holistic approach to patient care which focuses on understanding the entire patient through body, mind, and spirit (NBOME, 2019). Doctor Still believed that "rational medical therapy" should include therapies which promote health and include osteopathic manipulative treatment of the musculoskeletal system and surgery, while the use of medications be used sparingly (NBOME, 2019). Still founded the first osteopathic medical school, The American School of Osteopathy in 1892, in Kirksville, Missouri. Osteopathic medical schools provide students with an intensive curriculum which prepares them to consider the health of the whole person and not just their symptoms (Brokaw et al., 2016). During the four years of medical school, students learn to use their minds, senses, and hands to help diagnose and treat patients.

The first two years of the curriculum, referred to as the preclinical years, focus on academics dealing with basic science, clinical science courses, and shadowing of physicians, while during the last two years, students are placed in clinical settings to complete their rotations in hospitals and private practices. Osteopathic medical students must pass the Comprehensive Osteopathic Medical Licensing Examination of the United States Level 1 (COMLEX) to meet eligibility to begin their third year of clinical rotations (Zhong et al., 2021). This exam is the first licensing exam in a series of three. After successfully completing the COMLEX-Level 1, they will then be eligible to take the COMLEX- USA Level 2, and graduate to receive a Doctorate in Osteopathic Medicine (D.O.) degree (Zhong et al., 2021). Once they have graduated and successfully

"Matched" into a residency program, they will then be eligible to take the COMLEX-USA Level 3.

Medical educators must prepare students to succeed academically and transition into clinical settings. In the past, medical school student advising focused primarily on career advising, by guiding them through the process of exploring a medical specialty, finding a mentor, and successfully matching into a residency program (Frosch & Goldstein, 2019). However, in 2016, a study was published which surveyed 12,500 medical students in the US, and of the 4,400 students who responded, 32 percent of them reported experiencing burnout, depression, or reported low mental health (Krisberg, 2016).

A national survey revealed 50 percent of medical school students experience burnout, while another study observed that medical students are more susceptible to burnout than their non-medical peers (Krisberg, 2016). Due to this increase in medical student burnout, "The World Health Organization (WHO) has included burnout in the 11th revision of the International Classification of Diseases (ICD-11) as an occupational phenomenon" (Jumat et al., 2020, p.1). "*Burnout* is defined as an unsuccessfully managed syndrome resulting from chronic workplace stress" (Jumat et al., 2020, p.1). Thompson et al. (2016) defined burnout as a "specific syndrome consisting of emotional exhaustion (EE), depersonalization (DP), and a low sense of personal accomplishment (PA)" (p.174). For this study, the definition provided by Thompson et al. (2016) is used.

A group of medical students, residents, and early career physicians participated in a national survey between 2011 and 2012, and it was observed that relative to the general U.S. population, 49.6 percent of medical students (4,402 students who responded out of

12,500) experienced burnout in both osteopathic and allopathic medical school programs, compared to 35.7 percent of population and college graduates from other programs (Dyrbye et al., 2014). There are several negative consequences associated with burnout which affect students professionally and personally (Thompson et al., 2016). Students experiencing burnout are more likely to engage in unethical and dishonest behaviors, consider dropping out of their medical programs, and are 2 to 3 times more likely to have suicidal ideation compared to their peers who are not experiencing burnout (Thompson et al., 2016).

A longitudinal study was conducted with the class of 2021 at Duke-NUS, and 59 students participated (Jumat et al., 2020). 32.2% of those who responded indicated experiencing burnout at some point during their first year of medical school (Jumat et al., 2020).

> "Burnout can be observed as early as medical school, where medical students from various countries are reporting higher incidences of burnout when compared to their non-medical student counterparts. Students experiencing burnout have shown inability to connect with others, a strong desire to leave the institution and the profession, and higher likelihood of suicidal ideation. Following matriculation, medical students report increasing incidence of burnout throughout the course of medical school. Reasons for the high burnout rate amongst medical students include the heavy cognitive load, intense competition among classmates, and constant exposure to death and suffering" (Jumat et al., 2020, p.2).

In response to this growing awareness of both student burnout and depression among the medical student population, an initiative was placed on student wellness to

provide support concerning a wide range of possible needs (Frosch & Goldstein, 2019). Medical educators play an important role in supporting students in many areas, such as academic advising, study skills, time management skills, screening, and referral for mental health concerns (Frosch & Goldstein, 2019). These medical educators are faculty who are specifically trained to provide these designated skills to students (Frosch & Goldstein, 2019). It is critical that they are aware of the factors which raise a red flag that a student may be at risk of academic failure or of potentially failing the COMLEX Level USA-1(Frosch & Goldstein, 2019).

Zhong et al. (2021) explained that there is a significant motive for osteopathic medical schools to identify students as early as possible who may be at risk of failing or performing well below the average on the COMLEX Level 1. Graduate medical education (GME) programs look at students' first- and second-year preclinical grades, specifically the basic science courses. Comprehensive Osteopathic Medical Self-Assessment Exam (COMSAE), Comprehensive Osteopathic Medical Achievement Test (COMAT) scores and Comprehensive Osteopathic Medical Licensing Examination (COMLEX) scores are seen as predictors to determine if a student will be successful in matching into a graduate medical education program at the end of their four years (Miller-Matero et al., 2018).

Statement of the Problem

The problem is there are osteopathic students who struggle academically and experience difficulties, which include course failures during their preclinical year courses, repeating of an academic year, and struggling to pass their first licensing exam, the COMLEX Level 1, on their first attempt. Despite meeting the rigorous medical

school admissions requirements, some osteopathic medical students struggle academically and experience challenges once in the program. These include failing courses during preclinical years and having to retake them, failing too many course credits that they need to repeat an entire year, or failing the first medical licensing examination and having to retake it more than once to pass.

According to the National Board of Osteopathic Medical Examiners (NBOME), the number of students who had to retake the licensing exam after failing on their first attempt for the last five academic years are listed below.

2017-2018 out of 6768 students, 364 were repeat test takers, and 84.9% of those successfully passed on their repeat attempt.

2018-2019 out of 7120 students, 459 were repeat test takers, and 78.4% of those successfully passed on their repeat attempt.

2019-2020 out of 7478 students, 456 were repeat test takers, and 77.9% of those successfully passed on their repeat attempt.

2020-2021 out of 7958 students, 553 were repeat test takers, and 74.5% of those successfully passed on their repeat attempt.

2021-2022 out of 8089 students, 681 were repeat test takers, and 75.8% of those successfully passed on their repeat attempt.

This qualitative study will focus on the group of osteopathic medical students who experience academic difficulties during their first two years or who do not pass their licensing exam on their first attempt and explore how they navigated those challenges to successfully transition into their clinical years. The transition from preclinical to clinical training has been reported to be a source of stress and anxiety for medical students (Hayat

et al., 2020; Malau-Aduli et al., 2020), as many students do not perceive themselves to be prepared for clinical training (Malau-Aduli et al., 2020). Diem and Hairrell (2019) posited that students who have struggled during their preclinical years and moved to their clinical years, may still experience academic difficulties. The authors revealed that "15% of medical students in their 3rd year and about 11% of 4th year students in the United States struggle academically" (p. 84). Ridinger et al. (2018) stressed that remediation is an approach to correcting any underlying learning deficit in a student and is not always associated with decisions of academic promotion.

Areas of concern were listed as an inability to integrate large amounts of information, poor time and stress management skills, and poor test-taking skills (Guerrasio et al., 2014), poor test-taking skills (Malau-Aduli et al., 2020; Guerrasio et al., 2014), lack of medical knowledge, work-life-balance, and interpersonal stress (Ridinger et al., 2018). There is a need for administrators to ensure that medical students receive the necessary training, which builds their confidence and prepares them to provide adequate healthcare services, and which meet the needs of future healthcare workforce demands (Ridinger et al., 2018). Exploring the needs of this population of osteopathic medical students would help medical school programs determine the most effective interventions and programs which support the student experience and overall retention efforts.

Background and Justification

Medical school programs are extremely intense and rigorous, and it is not uncommon to encounter students who experience academic difficulties (Diem & Hairrell, 2019). Students facing academic difficulties are those who face concerns ranging from poor class performance to professionalism issues (Diem & Hairrell, 2019). However,

successful performance in both medical school and on national board exams is imperative to all medical education programs. It is no secret that students gravitate to programs which yield top performers and high graduation rates. In the case of medical school programs, students are looking for the number of graduates who successfully matched into residency programs. High rates of unmatched students in a medical program would result in low admission enrollments into the program.

COMLEX Level 1 Rates

All students are required to take and pass the COMLEX Level 1 prior to moving into the clinical years of their programs. The scores below show the performance on first time pass rates of students for the COMLEX Level 1 and are listed by academic year for the college being studied and comparing it to the national average of first-time takers total pass rate.

- 2021-2022 – 94% of students passed on the first attempt, with the national total first time pass rate of 92% total pass rate.
- 2020-2021 – 94% of students passed on the first attempt, with the national total first time pass rate of 94% total pass rate.
- 2019-2020 – 90% of students passed on the first attempt, with the national total first time pass rate of 94% total pass rate.
- 2018-2019 – 92% of students passed on the first attempt, with the national total first time pass rate of 93% total pass rate.
- 2017-2018 – 92% of students passed on the first attempt, with the national total first time pass rate of 96% total pass rate.

During the span of 2010 to 2017, Western University of Health Sciences observed a 4.8% rate of first attempt failure on the COMLEX Level 1 from a pool of 1726 students (Zhong et al., 2021). Medical schools are motivated to identify students who are students who are either at risk of failing the COMLEX Level 1 or performing poorly. The authors explained that additional support can be offered to these students through various academic means (Zhong et al., 2021, p.2). The authors found that students in the top 20% of the class passed the COMLEX Level 1 on the first attempt, whereas students in the lowest 5% of their class passed this board exam. Identifying students who are at risk of failure based on their basic science course performance is critical to providing them with the assistance and support they need to succeed on their COMLEX Level 1 exams (Zhong et al., 2021). Additionally, the authors posited that when students have low MCAT scores and course grade scores lower than 71% in their basic science courses during the first three semesters, it was significant at predicting COMLEX Level 1 scores lower than 500 (Zhong et al., 2021). Course failures and repeating the year are not the only concern for students, it also represents increased student debts (Brazeau et al., 2014). The aim is to identify students who had failed or were at risk of failing, to provide them with necessary feedback, skills building, and set goals to help prevent any further failures (Diem & Hairrell, 2019). Guerrasio et al. (2014) stressed that students who are struggling and must go through the remediation process require a significant number of resources. “Medical students in this study were more likely than other learners to be identified as having mental well-being issues” (Guerrasio et al., 2014, p.356). “This may be because students are under the stressors of having their careers paths determined by

their grades and receive higher-stakes evaluations than do learners in later training" (Guerrasio et al., 2014, p.356).

Deficiencies in the Evidence

It is well-known that medical school training is stressful and is associated with high burn-out rates (Prayson et al., 2017). Medical students will experience stressors and major life experiences, such as health issues, death in the family, sickness, and birth of a child, which are outside of their control and may affect their academic performance (Diem & Hairrell, 2019; Prayson et al., 2017). Nevertheless, there are outside factors which influence a student's overall academic success during their preclinical years in medical school (Prayson et al., 2017). A method of monitoring student progress and identifying the specific learning needs of students is crucial for any medical training program to have (Ridinger et al., 2018). Successful remediation cannot be defined the same way for all students (Guerrasio et al., 2014). Therefore, providing the necessary coaching along that individual's developmental path is key to the learner's success (Ridinger et al., 2018). It is worth noting that for most, student success is defined as being able to practice medicine safely, however, for others, it may mean choosing a different career path. There is a substantial need to explore the resilience strategies medical students employ to address this challenge (Prayson et al., 2017).

There is a significant gap in the literature which addresses interventions to prevent distress in medical students (Brazeau et al., 2014; Thompson et al., 2016; Prayson et al., 2017; Kemp et al., 2019; Weber et al., 2019; Picton, 2021). There is a need for medical schools to develop interventions for medical students to prepare them to build resilience through suitable coping strategies and social support which are approach-oriented rather

than avoidance-oriented (Thompson et al., 2016; Weber et al., 2019). It takes the contribution from the different school stakeholders such as faculty, staff, administration, and clinicians to provide guidance and support (Diem & Hairrell, 2019). A review of the literature on the remediation of medical students has revealed that only a small number of studies have published information on this subject, and furthermore, those studies only concentrated on remediating certain skill sets and did not reveal any methods which would guide students who are remediating due to academic difficulties (Guerrasio et al., 2014). The authors recommended that more research be conducted on this topic, to obtain defined methods and outcomes which can be used as a guide for best practices in remediation. "Although remediation of struggling learners requires substantial resources, it can be very helpful" (Guerrasio et al., 2014, p.357).

Audience

This study would benefit medical educators who teach the courses during the preclinical years to the incoming medical students. It would benefit the medical school stakeholders such as faculty, staff, administration, and clinicians who work with the students to understand the support students need and how to best advise them. The findings of this study would also benefit future osteopathic medical students who experience academic difficulties as they navigate through stress, family, and study obligations, to persist and successfully transition into the clinical years.

Setting of the Study

The institution where the study was conducted is a private not-for-profit institution with state supported health sciences programs in South Florida. The program of interest is in the osteopathic medical college which has approximately 410 first year

students (M1), 410 second year students (M2), 410 third year students (M3), and 410 fourth year students (M4). The osteopathic medical college increased their class size by 162 students each year in 2019 with the opening of a new campus location also located in Florida.

Researcher's Role

The researcher serves as the director of student affairs for the college of osteopathic medicine within that institution.

Preliminary Purpose of the Study

The purpose statement of any research is a declarative statement which guides the direction of the study (Creswell & Guetterman, 2019). The purpose of this qualitative case study was to investigate, identify, and describe the specific strategies used by osteopathic medical students to navigate the academic and personal challenges faced during their preclinical years to persist and successfully transition into the clinical years of the medical program in a large medical school in South Florida.

Definition of Terms

Academic Difficulty

Students experiencing academic difficulty are defined as students who face concerns ranging from poor class performance to professionalism issues (Ridinger et al., 2018; Diem & Hairrell, 2019). However, for the purposes of this study the definition provided by the research site defines it as those who fail a single course that requires remediation, those who met the criteria to repeat an academic year of first or second-year courses, or those who failed the COMLEX Level I on the first attempt.

Allopathic

Allopathic, also known as Western medicine, are science-based medical programs. They are also four years in length and include medical science coursework and clinical rotations. The difference between allopathic and osteopathic medical programs is the additional training on osteopathic manipulation which D.O. students received. Allopathic students are not required to take the COMLEX licensing exams to graduate. However, they must successfully pass the United States Medical Licensing Examination (USMLE) Step 1, Step 2 to graduate with a medical doctor degree (M.D.).

Comprehensive Osteopathic Medicine Licensing Exam (COMLEX)

This term refers to the national board exams for osteopathic medical students. Osteopathic students must take COMLEX Level 1, Level 2 CE, and Level 3 (NBOME, 2023).

Graduate Medical Education (GME)

This term refers to the formal training that a student acquires after completion of medical school in both osteopathic and allopathic programs. This training usually involves a year of internship and additional years of residency (Miller-Matero et al., 2018).

MCAT

The MCAT, a standardized exam with verbal, physical science, and biological science subtests. Most U.S. medical schools use MCAT as a factor during the admissions process (Miller-Matero et al., 2018).

National Board of Medical Examiners (NBME)

This board administers the USMLE Steps I, II, and III for allopathic medical students.

National Board of Osteopathic Medical Examiners (NBOME)

This refers to the group that administers COMLEX for osteopathic medical students.

Osteopathic

Osteopathic medicine is a holistic approach to patient care which focuses on understanding the entire patient through body, mind, and spirit (NBOME, 2019). Programs are four years in length and include medical science coursework, osteopathic principles and practice, and clinical rotations. Osteopathic medical students must pass the Comprehensive Osteopathic Medical Licensing Examination of the United States Level 1 (COMLEX) to meet eligibility to begin their third year of clinical rotations (Zhong et al., 2021). This exam is the first licensing exam in a series of three. After successfully completing the COMLEX-Level 1, they will then be eligible to take the COMLEX- USA Level 2, and graduate to receive a Doctorate in Osteopathic Medicine (D.O.) degree (Zhong et al., 2021). Once they have graduated and successfully "Matched" to a residency program, they will then be eligible to take the COMLEX- USA Level 3.

Chapter 2: Literature Review

Chapter Introduction

The review of the literature identified and explained the different areas which are attributed to medical students experiencing academic challenges during their preclinical years of medical school. Prior research identified several challenges experienced by these students and the need to explore resilience strategies which can be employed to address those challenges (Prayson et al., 2017). Two theoretical frameworks will underpin this study, the theory of self-efficacy and attribution theory. The preparations needed to become a medical student are also presented in this chapter, as well as several additional variables which have been identified as important strategies and skills needed to be learned by osteopathic medical students. These strategies are identified as management of time, management of stress, management of personal well-being, seeking help and support, learning resiliency, and self-regulation. Lastly, gaps found in the literature, and this study's research questions are presented.

Search Strategy and Introduction to the Literature

The following keywords were used to search for relevant information for this study: medical students, academic difficulty, medical schools, challenges in medical school, preclinical years, time management, strategies of success, and adult learners. Although there are considerable studies concerning medical students' academic success, the researcher will focus on studies concerning students who experience academic difficulties when completing their programs. A review of existing literature on the topics of (a) students entering medical school and wellness, the (b) preclinical years of medical school, the (c) challenges experienced by medical students, (d) self-regulated learning, (e) work-life-school balance, (f) self-efficacy, and the (g) theories used for this study was

conducted through exploration in Nova Southeastern University's online library systems, Alvin Sherman Library, ProQuest, Eric, Dissertations and Theses@ Nova Southeastern University, and by Google Scholar search engine. A review of the literature specific to osteopathic medical students was derived from national reports from the Association of American Medical Colleges (AAMC) and National Board of Osteopathic Medical Examiners (NBOME).

It is well known that medical school is extremely stressful, and a student must adjust to a heavy workload. Medical students must go through a developmental change to successfully deal with numerous psychosocial challenges which they will face throughout their program (Heinen et al., 2017). More importantly, they must learn to integrate into their new academic environment if they are to succeed academically (Malau-Aduli et al., 2020). While most students can successfully transition into the medical program, inevitably some students will experience academic difficulty (Malau-Aduli et al., 2020). Medical students must navigate through the curriculum, adjust to a new environment, and adjust to an increased workload. Challenges with time management and insufficient study time have been reported as significant issues during clinical training (Malau-Aduli et al., 2020). The researchers stressed that medical students must implement new learning strategies which promote active learning and help develop analytical reasoning skills. While medical students meet stringent requirements set by graduate admissions to successfully matriculate into a medical school program, 7% to 9% experience academic difficulty during their preclinical years of the program (Malau-Aduli et al., 2020).

Preclinical Years of Medical School

Medical students are accepted into a medical program based on extremely rigorous admissions requirements, with the expectation that candidates who meet them will succeed in the program (Davies et al., 2020). Traditionally, four-year medical school programs are organized in two parts: preclinical and clinical (AAMC, 2021). The first two years of the curriculum, referred to as the preclinical years, focus on academics dealing with basic science such as gross anatomy, cardiovascular and pulmonary systems, gastrointestinal system, pathology, microbiology, and pharmacology (AAMC, 2021). The first two years also focus on medical concepts, the structure and functions of the body, diseases, diagnoses, and treatment concepts (AAMC, 2021). Students will also learn basic doctoring skills, taking medical histories, and essential competencies, clinical science courses, and shadowing of physicians (AAMC, 2021). During the last two years, known as the clinical years, students are placed in clinical settings to complete their rotations in hospitals and private practices. Students will receive basic instructions and obtain hands-on experience with patients in several medical specialties (AAMC, 2021).These specialties are family medicine, psychiatric medicine, internal medicine, general surgery, obstetrics and gynecology, pediatrics, and rural and urban underserved medicine. The curriculum may vary slightly for each medical program, as some will integrate multidisciplinary programs and introduce clinical training and patient interaction in the beginning of the program while others wait until after the preclinical years (AAMC, 2021).

Just as medical programs may vary, so do the grading modes. Many schools have transitioned to the pass/fail system or the honors/pass/fail system, while others continue

to use the letter grading system (AAMC, 2021). Others use a combination of a pass/fail and letter grade system for the first year, then switch to honors/pass/fail system for the last two years (AAMC, 2021). Previous research has shown that the grade mode used during the first two years of medical school has been attributed to medical students' level of stress (McClain, 2009). For this reason, many programs have eliminated letter grades and rankings, and increased the focus to elective time, more patient contact earlier in the curriculum, and emphasizing interdisciplinary teaching (Sookdeo, 2016).

During the preclinical years of a medical program, students are expected to learn a large volume of medical information every semester (AAMC, 2021). When laboratory sessions, preparation, and study time are all factored in, the student course load is equivalent to 24 credits per semester, spending an average of 72 hours per week on course work (Sookdeo, 2016). In addition to the heavy course load which students are required to learn by demonstrating their retention and integration of knowledge through multiple written and practical exams, osteopathic medical students must pass the Comprehensive Osteopathic Medical Licensing Examination of the United States Level 1 (COMLEX) to meet eligibility to transition into their clinical years to complete their clinical rotations (Zhong et al., 2021). Although not required to graduate, many osteopathic medical students also opt to take their United States Medical Licensing Examination (USMLE) Step 1, as they believe this will make them more competitive when applying for graduate medical education (GME) (Miller-Matero et al., 2018). Students spend countless additional hours during their second year, preparing for these licensing exams, because they believe that their future in obtaining a GME position and their future in medicine depends on how well they perform. These scores are used by

program directors as predictors to determine if a student will successfully match into a graduate medical education program at the end of their four years (Miller-Matero et al., 2018).

Challenges Experienced by Medical Students

Due to the rigor of medical school and extensive amount of information which medical students must learn; it is not uncommon for them to experience academic difficulties during their preclinical years (Diem & Hairrell, 2019). Perseverance or persistence is needed to successfully complete any doctoral level program. There are factors that are outside of the student's control which will influence their overall academic performance during their preclinical years in medical school (Prayson et al., 2017). "Oftentimes, outside stress factors related to family and finances prevented a student from being successful" (Diem & Hairrell, 2019, p.86). Additional reasons for experiencing academic difficulties have been noted as the inability to integrate large amounts of information, poor time management skills, poor or lack of stress management skills, poor test-taking skills (Malau-Aduli et al., 2020; Guerrasio et al., 2014), medical knowledge, work-life-balance, interpersonal stress (Ridinger et al., 2018), lack of professionalism (Ridinger et al., 2018; Ahmady et al., 2019), or substance abuse or mental health crises (Ridinger et al., 2018).

Experiencing sleeping problems is very common within the general population, however, it is even more prevalent with medical students as they are more vulnerable to sleep deprivation (Perotta et al., 2021). Sleep deprivation within the medical student population has played a significant role in academic performance and their mental health (Perotta et al., 2021). Medical students experience sleep disturbances for many reasons

which include class and study hours, clinical clerkship hours which may include overnight shifts, emotional stress, lifestyle choices, and long hours on social media (Perotta et al., 2021). Obtaining good quality sleep is critical to long term learning, for neurocognitive and psychomotor performance, and for physical and mental health. Medical students may be more susceptible to depressive and anxiety disorders when they are sleep deprived. A nationwide study conducted by the National Sleep Awareness Roundtable in the United States discovered 35.3% students who responded reported sleeping less than 7 hours per night (Beijamini et al., 2016). This raised concerns for patient safety when health care professionals are deprived of sleep (Perotta et al., 2021). There is a gap in the literature on the topic of sleep quality and sleep deprivation and how it affects the medical student's academic environment (Perotta et al., 2021).

A multicentric study assessing the overall quality of life and the quality of life of a medical student (MSQoL) and assessing the QoL from health professions student in areas of time management, psychological, physical health, and learning environment, discovered that there was a consistent relationship between daytime sleepiness and sleep deprivation (Perotta et al., 2021). There was also a relationship between perception of quality of life and academic environment, and anxiety and depression symptoms in medical students (Perotta et al., 2021). Additionally, female students were noted to have higher daytime sleepiness compared to male students (Perotta et al., 2021). In a similar study conducted by Beijamini et al. (2016) using the Pittsburgh Sleep Quality Index (PSQI), women reported having a higher score in poor sleep quality than men.

A review of the literature associated with the topic of challenges experienced by doctoral students primarily focused on completion and attrition rates (Bair & Haworth,

2004; Devos et al., 2017; Boone et al., 2020), time to degree, socialization processes, gender and race (Orom, 2013; Sverdlik et al., 2018), and behavioral issues (Prayson et al., 2017; Sverdlik et al., 2018). A gap in the literature was found to understand the developmental and underlying factors which affect the medical students' experience, affect their personal lives and well-being (Sverdlik et al., 2018).

Theoretical Framework

There are two theoretical frameworks which will guide this study, Bandura's (1988) theory of self-efficacy and Kelley and Michela's (1980) interpretation of attribution theory. Albert Bandura's (1988) theory of self-efficacy originated from the social learning theory and has been used to examine the facets of purposeful management of time, management of stress levels, motivation, and learning strategies students used when experiencing academic challenges (Rudland et al., 2021; Şen, 2016; Bandura, 2010). Kelley and Michela's (1980) interpretation of attribution theory as it relates to motivation was used to examine how it influences a learner's well-being, seeking support, and defining goals. The theories will help provide an understanding as it relates to the strategies used by osteopathic medical students when navigating challenges during their preclinical years.

Social Learning Theory and Self-Efficacy

Social learning theory is used in the understanding of human behavior and how individuals learn and understand new information. This theory was developed as it recognized concepts of a learner's ability to learn through observation and experience (Bandura, 1977; Rudland et al., 2021) and the importance of the learner's mental state (Bandura, 1977; Bandura, 1994). This explains why the student/teacher or

student/clinician relationship is so important (Rudland et al., 2021). A recent study showed that students who received mentorship were able to learn how to identify stressors and were able to articulate which resilience strategies to utilize for those stressors (Prayson et al., 2017).

Self-Efficacy

The theory of self-efficacy evolved from the social learning theory, as Bandura identified an additional element to motivation as an individual's belief. Self-efficacy theory states that beliefs determine how people feel, think, motivate themselves, and behave in different situations (Bandura,1994). The theory stresses that when a student's belief in their self-efficacy is high, they can regulate their learning and master their academic activities which determine their goals, level of motivation, and academic accomplishments (Hayat et al., 2020; Bandura, 2010). Efficacy expectations reveal the level of effort an individual will expend and how long they will persist toward their goal when they are faced with challenges and obstacles (Bandura, 1977). Self-efficacy is thought to be an important factor which influences student academic success and is a strong predictor of future academic performance in first year medical students (Hayat et al., 2020). The stronger the perceived self-efficacy, the more active efforts are used. An individual's beliefs of self-efficacy can guide them either positively or negatively, depending on their own views (Hayat et al., 2020).

Bandura (1977, 1994) defined perceived self-efficacy as "peoples' beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (p.1). Self-efficacy beliefs determine how people feel, think, motivate themselves, and behave. Students with high levels of self-efficacy are more

committed, have higher endeavors, and are more apt to persevere through challenges (Hayat et al., 2020; Bandura, 2010). Expectations of personal self-efficacy would determine when coping behaviors would be initiated, how much effort would be expended, and more importantly, how long it would sustain an individual when faced with obstacles and adversity (Bandura, 1977). Four sources of efficacy expectations were proposed by Bandura (1977), stating that they are used to reduce defensive behavior and are the principal source through which different treatments operate to create expectations of mastery. The sources are listed as performance accomplishments, vicarious experiences, verbal persuasion, and physiological states (Bandura, 1977).

Performance Accomplishments

This source of efficacy is explained to be the most influential as is based on personal master experiences (Bandura, 1977). The more success experienced, the higher the mastery expectations, the more failures experienced, the lower their expectations will be (Bandura, 1977). Repeated success will allow strong efficacy expectations to be developed, however, occasional failures which are overcome by efforts of determination can increase self-motivated persistence (Bandura, 1977). Individuals are more likely to use the mastery behaviors to different situations, but the expected results may be similar (Bandura, 1977).

Vicarious Experiences

Modeling behaviors is key for this source of efficacy expectation to be successful. Bandura (1977) stressed that when people observe others performing possibly adverse activities without the negative consequences, then it will create expectations in them which will help them persist in their own efforts. Allowing observers to believe that they

are capable of success. Bandura (1994) stated that modeling perceived self-efficacy is influenced by the similarity of the model being used. If failure is being modeled, then self-efficacy reduces in observers, if success is being modeled, then self-efficacy increases.

Verbal Persuasion

Bandura (1977) explained that verbal persuasion influences behaviors in others easily because they can be persuaded through suggestion to believe that they are capable of mastering different activities when they are faced with challenges. However, efficacy expectations will not be strong because they are not based on actual experience (Bandura, 1977). Therefore, people must be provided with the provisional aids to help master their performance in difficult situations to raise their expectations (Bandura, 1977).

Physiological States

Emotional and somatic responses such as stressful and taxing situations are another source which affects perceived self-efficacy when facing and coping with challenging situations (Bandura, 1977). People tend to translate their personal reactions to stress as signs of vulnerability. The higher the physiological arousal, the more debilitating it can be to their performance (Bandura, 1977). When the emotional arousal is low, the emotions are positive, the perceived self-efficacy becomes an energizing facilitator of performance (Bandura, 1994).

Self-Efficacy in Medical Education Research. Self-efficacy theory has been applied in the medical setting and in prior medical research to understand the relationship between learning strategies and academic performance in medical students (Hayat et al., 2020), and to understand the important role self-efficacy beliefs plays in the learning

and development of medical students (Klassen & Klassen, 2018). It has also been applied to the clinical nursing setting (Bellucci, 2016), and to investigate doctoral persistence in medical students and doctoral nurses (Munro-Cohen, 2011, Mann, 2011). Although there are considerable research studies concerning medical students' academic success, a gap in the literature exists which focuses on how self-efficacy develops in medical students and how it relates to the strategies used to navigate the challenges experienced during medical school.

Attribution Theory

Attribution theory as it relates to motivation is used to examine personal well-being, seeking support, and defining motivations. The theory of attribution was initially proposed in 1958 by psychologist Fritz Heider (Demetriou, 2011). The theory focused on the events which people wrestle within their lives and whether they will attribute the outcomes of those events to internal or external factors (Demetriou, 2011). The theory was then adapted by Weiner (1972) and further developed in association to motivation and emotion where causal attributions are essential (Weiner, 1985). It describes how individuals interpret events and how they interpret those events and how it influences their motivation for learning and future learning behaviors (Demetriou, 2011; Weiner, 1979).

Kelley and Michela's (1980) interpretation of attribution theory heavily stressed perceived causation, which refers to the perception or inference of cause. Weiner (1979) believed that individual successes and failures in academic achievement are categorized in four causes of behavior- ability, effort, task difficulty, and luck (Dong et al., 2013; Demetriou, 2011). These four causes of behavior are placed in two dimensions, source of

the cause and the stability of the cause (Bardwell, 1986). The source of the cause can be based on internal abilities or external abilities, while the stability of the cause can be determined as stable or unstable. The different attributes are used based on patterns of past behaviors and based on the outcomes (Bardwell, 1986). Weiner (1985) noted that attributions influence a learners' expectations of success, responsibility, and emotions, which in turn influences their motivation and academic performance (Dong et al., 2013). Evidence supports Weiner's (1985) theory that students will make a range of causal attributions which will influence their academic development and success (Dong et al., 2013). Weiner's (1985) viewed the pattern of making causal attributions to poor performance as positive because he believed that low effort and poor strategy are controllable (Dong et al., 2013). These are the unstable factors which motivate students to improve their poor academic performance and push them to persist in their programs (Dong et al., 2013).

Motivation for Self-Enhancements and Protection

An individuals' positive behaviors and successes can enhance one's self-esteem if the individual takes responsibility for their actions. Kelley and Michela's (1980) stressed that motivation for self-enhancements should result in positive behaviors of self-attribution. Likewise, negative behaviors may negatively affect an individual's self-regard and will result in motivation for self-protection (Kelley & Michela, 1980). Most believe that success is usually internally caused, while failure is externally caused. When examining how students attributed their failures, they discovered differences among Asian and Western students. Asian students attribute their failure to internal, controllable causes which is known as self-critical attribution pattern, while Western students attribute

their failures to external causes, which is known as self-enhancement pattern (Dong et al., 2013).

Bandura (1986) stressed that mastery experiences is an important source of self-efficacy and is key to the self-enhancement model of academic achievement. This model states that to increase academic achievement, educational efforts should place an emphasis on altering students' beliefs of their self-worth or competence (Bandura, 1994, p.21). Alicke and Sedikides (2009) expounded on this topic stating that people tend to advance to one or more self-components or protect themselves from negative self-views. Yet, they shared that there is some ambiguity on how self-enhancement and self-protection influence an individual's identity, psychological and physical health, and social relations (Alicke & Sedikides, 2009). The two attribution and motivational states which influence desirable behaviors are empowerment and resilience (Harvey & Martinko, 2009).

Empowerment

Empowerment is a desirable state of motivation which is caused by positive expectations when efforts from activities lead to rewards (Harvey & Martinko, 2009). As it pertains to self-efficacy, empowerment is a result of causal attribution, from events which are either internally or externally controllable, unstable, or uncontrollable (Harvey & Martinko, 2009). The authors emphasized that individuals who equate positive events to their internal factors, they experience empowerment (Harvey & Martinko, 2009, p.153). These internal factors are listed as intelligence, skills, and efforts. One caution offered by the authors regarding optimistic attribution style is that individuals may be

disillusioned by their actual skills and abilities, when they may be deficient in those areas (Harvey & Martinko, 2009).

Resilience

Resiliency is defined as “a dynamic capability which can allow people to thrive on challenges given appropriate social and personal context” (Thompson et al., 2016; Howe, 2012). This definition suggests that resiliency can be learned behavior and is dependent on personal or social factors (Thompson et al., 2016). Previous research examined resiliency in different fields and learned that positive coping mechanisms such as seeking social support are positively associated with resiliency (Thompson et al., 2016). When medical students seek advice from seniors, learning among peers, and resilience were correlated to good coping strategies and positive adjustments (Malau-Aduli et al., 2020). Coaching and supportive relationships may have positive influences on medical students (Prayson et al., 2017). Coping strategies during the clinical transitioning process are necessary for effective studying, which in turn improves student expectations and personal resilience (Malau-Aduli et al., 2020; Prayson et al., 2017).

Attribution Theory in Medical Education Research. When reviewing literature for the use of attribution theory in medical education as a framework, it revealed that it was not widely used. However, attribution theory was widely used as a framework for working with undergraduate students, when advising undergraduate students on probation (Demetriou, 2011), investigating college students learning a foreign language (Dong et al., 2013), exploring college students' belief patterns (Khan, 2020), to test racial attitudes (Trahan, & Laird, 2018), and on the investigation of strategies used by doctoral nursing students for balancing work, family, and academics (Bellucci, 2016). Attribution theory

has also been used to investigate how first year undergraduate students' causal attributions were associated with their poor academic performance (Dong et al., 2013; Perry et al, 2008).

Application of Theories to the Current Study

Self-efficacy as it relates to social learning theory provides a framework for understanding the importance of intrinsic motivators for learning new skills and attaining knowledge for medical students (Bandura, 1988; Klassen & Klassen, 2018; Weber et al., 2019). A review of the current literature revealed that social learning theory was used as a framework for research on doctoral students to explore processes of learning (Horsburgh & Ippolito, 2018; McHugh et al., 2021), modeling learning strategies (Şen, 2016), and earning self-regulatory skills for medical and allied health students (Ngwira et al., 2017). Greenhill et al. (2015) also used social learning theory as a framework to conduct a longitudinal study to understand resilience in medical students. The theory of social learning theory and self-efficacy was deemed appropriate in this current study as it relates to the abilities of osteopathic medical students and how it influences their performance accomplishments, their vicarious experiences, verbal persuasions, and their physiological states to navigate through challenges during their preclinical years of medical school.

Kelley and Michaela's (1980) explanation of motivation reviews the internal and external abilities which individuals attribute to their outcomes to. Many students believe that success is attributed to internal abilities, while failure is externally caused. A review of the current literature revealed that attribution theory was used as a framework to understand student motivation (Harvey & Martinko, 2009), causality of behavior (Gaier, 2015), and persistence motivation (Okoroji, 2018). Attribution theory was also used to

investigate how medical students attain work-life balance (Picton, 2021), and the resilience strategies they use to reduce stress and burnout (Prayson et al., 2017). For this study, the inclusion criteria will require that students self-identify as (a) having faced challenges during their preclinical years of medical school which Utilizing the attribution theory for this study was deemed appropriate as it relates to the abilities of osteopathic medical students and how it influences a medical student's motivation for self-enhancements and protection, empowerment, and resilience.

Review of the Research Literature

Entering Medical School and Wellness

Thompson et al. (2016) stated that medical students typically begin their medical school journey with better mental health indicators than similar aged students entering other graduate and professional programs, but these indicators rise as they progress through their medical programs. Previous research has shown that students experience a lower risk of burnout and distress during the enrollment period, because they have not yet entered the learning environment which contributes to their stress levels (Brazeau et al., 2014). They matriculate into the medical programs with overall higher quality of life (QoL) scores across specific domains when compared to college students in similar age groups from the general population who were pursuing other careers (Brazeau et al., 2014).

In recent years, medical students' mental health has been a topic of concern due to stressors such as burnout, anxiety, and depression caused by the intensity of medical training programs (Hayat et al., 2020; Malau-Aduli et al., 2020). Research has shown that even though medical schools are filled with the brightest students who were at the top of

their classes, they experience distress which negatively impacts their mental health (Dyrbye et al., 2014). Increasing the need for medical schools to provide them with the necessary tools to prevent burnout and manage stress effectively (Picton, 2021; Kemp et al., 2019; Weber et al., 2019; Prayson et al., 2017; Thompson et al., 2016; Brazeau et al., 2014; Dyrbye et al., 2014). Previous studies have suggested that academic stress, lack of personal support, financial concerns, and being exposed to human suffering and death are challenges which contribute to the decline of the medical student's mental health (Byrnes et al., 2020).

Brazeau et al. (2014) reported that a cross-sectional longitudinal survey administered to 4,287 medical students at seven medical schools revealed 49.6% reported burnout and 11.2% reported suicidal ideations. The authors identified the high prevalence of distress among medical students as low social support, stress from major personal life events, academic demands, low-quality learning environments, and harassment or discrimination. Burnout was more prevalent among medical students than those who were of similar ages in the U. S. population and were also more likely to experience higher levels of depression and fatigue from other college graduates ranging in ages 22 to 32 (Brazeau et al., 2014). Additionally, Mata et al. (2016) listed the top five factors which affected medical students' academic performance were stress, anxiety, difficulty sleeping, depression, and work.

Rotenstein et al. (2016) contended that medical students have higher rates of depression and suicidal ideation, estimates vary from 1.4% to 73.5% for depressive symptoms, and 4.9% to 35.6% for suicidal ideation. Additionally, The American College Health Association -National College Health Assessment II (ACHA-NCHA II) have

reported stress (31.9%), anxiety (25.9%), sleep difficulties (20.2%), depression (16.9%), sickness (12.9%), and work (12.5%) continued to affect student academic performance in 2018.

> "Reliable estimates of depression and suicidal ideation prevalence during medical training are important for informing efforts to prevent, treat, and identify causes of emotional distress among medical students, especially in light of recent work revealing high prevalence of depression in resident physicians", (Rotenstein et al., 2016, p.2215).

A systematic review and meta-analysis of depressive symptoms, depression, and suicidal ideation, among medical students during training reported that 27.2% experienced depressive symptoms and 11.2% experienced suicidal ideation (Rotenstein et al., 2016). Among the medical student population who screened positive for depression, only 15.7% pursued psychiatric treatment. Depressive symptoms among medical students are reported to be higher than the general population, which emphasizes the need for more effective preventative efforts and strategies, as well as increased access to care for medical students (Rotenstein et al., 2016).

Throughout the literature review four recurring themes have been identified as strategies used by doctoral students from medical school to navigate through challenges during their programs. These themes are management of time, management of stress, management of personal wellbeing, and seeking help. Additionally, resiliency is also found to be a critical aspect to persisting through medical school. Management of time and of stress are components stressed the social learning theory, while management of

personal wellbeing and seeking help are influenced by the attribution theory. The researcher chose to use both theoretical frameworks to underpin this study.

Management of Time

The topic of time management has been heavily researched in understanding how different learning strategies and positive study habits influence academic performance (Bickerdike et al. 2016). Researchers have also examined the different preferred learning styles between different genders (Stegers-Jager et al. 2012; Bickerdike et al. 2016), the stressors facing the millennial generation of medical students in relation to time management (Hill et al., 2018), and the impact of poor time management skills in doctoral students (Swanson Becker & Drum, 2015; Prayson et al., 2017; Hill et al., 2018). There is a need for incoming medical students to learn how to study and how to organize and manage their time by learning these skills at the very beginning of their program.

Swanson Becker and Drum (2015) stressed that many students do not have the proper time management skills to handle high-performance demands both academically and interpersonally, and therefore become easily overwhelmed. Prayson et al. (2017) questioned, “If future physicians are unable to care for themselves in the arenas of personal health, stress and time management, and life-balance, how can they do their best job in taking care of patients? (p.30). Malau-Aduli et al. (2020) stressed that evidence has shown that some medical students experience academic difficulties due to poor time management. Medical students have also shared the importance of having useful strategies which are centered around their curriculum and other aspects of medical school (Prayson et al., 2017). These strategies are useful to navigate through issues of time management, pursuing concurrent master’s degrees, shadowing physicians, building

communication skills, assuming leadership roles, setting limits, and strategies to prepare for board exams (Prayson et al., 2017).

Work-Life-School Balance

Medical students are under a lot of pressure to perform under the heavy workloads, they struggle to maintain life balance, they have limited control, and experience many unique transformative experiences during their training years (Prayson et al., 2017). They struggle between academic workloads, their personal and social lives, and their familial responsibilities (Martinez et al., 2013; Hill et al., 2018). Work-life-school balance is a significant contributor to a medical student's wellbeing and ultimately places a central role in the career decision they make (Picton, 2021). Some of those experiences include dissecting cadavers, performing physical exams on patients, and dealing with life and death issues with patients (Prayson et al., 2017). Martinez et al. (2013) conducted a study on the topic of how doctoral students attained balance between work, life, and school which revealed that students who were successful in balancing their time did so by purposely managing specific areas of their lives. These areas were identified as managing time, managing wellbeing by managing stress, receiving financial and emotional support from individuals and student services, and making the necessary tradeoffs needed to persist through their programs (Martinez et al., 2013, p.44). The authors defined purposeful management as managing the factors which are influential in their efforts to obtain school-work-life balance (p.45).

Purposeful management of time entails managing their time, priorities, and the different role and responsibilities they have. Martinez et al. (2013) stressed that time is a critical component of the three domains of school-work-life balance, because when time

is allocated to one of them, less time is allocated to the other (p.45). Managing wellbeing is important because balancing heavy workloads and different responsibilities can take a toll on a student's mental wellbeing, so it is important to manage health, stress, and personal time. Obtaining formal and social support is another important factor in attaining work-life balance. Receiving support from families and friends helps doctoral students obtain the balance they need to succeed. Doctoral students must make various tradeoffs which include finances, time with family, and time for self to balance the various workloads and responsibilities (Martinez et al., 2013). Doctoral students recognize that by being intentional when managing these factors allowed them to achieve work-life-school balance as much as possible (Martinez et al., 2013).

Picton (2021) proposed that medical students attain the necessary skills early in their program to learn how to study and manage time effectively to attain balance between their various obligations of school, work, family, and social life. Attaining a satisfactory level of balance was noted to be especially important for students with children (Sverdlik et al., 2018). Balancing between academic workloads and immersing into the clinical setting threatens the work-life balance and wellbeing of medical students, causing high rates of anxiety, depression, and stress (Picton, 2021). Sverdlik et al. (2018) stated that a lack of social and work-life conflicts has also been known to influence a doctoral student's well-being and increase mental health issues. Picton (2021) stressed that if students do not act early, students may experience burnout and decreased compassion and empathy. Interventions to improve study conditions and improve the students' abilities to cope with the stressors which they will experience are urgently needed (Weber et al., 2019). The author posited that having an "effective work-life

balance" is a protective factor against the risk of mental health concerns and may be seen as a self-care strategy. A student's ability to develop a positive work-life balance and self-care skills may influence their medical school experience and subsequently influence their specialty decision (Picton, 2021). To achieve work-life balance, students must be able to manage and negotiate between work, school, and family responsibilities and successfully navigate between those set borders (Picton, 2021). However, there is a need to better understand how students perceive and experience work-life balance (Picton, 2021). Previous studies have also examined how work-life-school balance has been attained by female physicians (Takahashi et al., 2017), medical students with children (Williams-Shakespeare et al., 2018; Sverdlik et al., 2018), how work-life-balance influenced medical specialties (Goodman, 2012; Kawamoto et al., 2016), and how it influenced career satisfaction (Keeton et al., 2007).

Management of Stress

Stress is one of the most important conditions which has a major impact on mental health and is related to depression, fatigue, burnout, and anxiety disorders and is correlated to low academic performance (Lampe & Müller-Hilke, 2021).

> "Constant academic pressure, increased workloads, financial problems, sleep deprivation, exposure to patients' suffering and death in combinations with a "hidden curriculum" of cynicism may then result in and vicious circle of stress and even more stress which in the long run leads to a decline of mental health", (Lampe & Müller-Hilke, 2021, p.2).

Psychological Development

Medical education is an extremely stressful program, and stressors such as stress, anxiety, and pressure are all factors which may interfere with a young adults' development (Lee et al., 2020). In turn, affecting their academic performance, resiliency, and psychological growth and development. Malau-Aduli et al. (2020) emphasized that medical students must undergo developmental change to adequately deal with the psychological challenges they encounter when studying medicine. Behavioral changes caused by stressors such as major life experiences have been noted to influence a student's academic performance (Diem & Hairrell, 2019; Prayson et al., 2017). Additionally, students experiencing high amounts of psychological distress have also seen their academic performance adversely affected (Lampe & Müller-Hilke, 2021). The authors mentioned that stress levels, especially prior to the first licensing board exam which is taken towards the end of the preclinical education, were shown to predict academic performance. Teaching medical students to become knowledgeable, empathic, and professional physicians and training them in methods for sustained stress reduction is critical (Lampe & Müller-Hilke, 2021).

Due to the alarmingly higher levels of stress which medical students are experiencing while completing their preclinical curriculum, the authors believe that the medical training process is a significant contributing factor to the mental health of future physicians (Brazeau et al., 2014). Chronic stress is linked to decreased compassion and empathy in student doctors, which means higher levels of depression, suicidal ideation, burnout, and higher occurrences of alcohol abuse in medical school, and if not addressed, these factors will continue into their professional careers (Weingartner et al., 2019). First

and second-year medical students have shared additional areas which significantly influenced their mental health while in medical school were experiencing financial problems, experiencing change in the health of a relative, experiencing personal illness or injury, and experiencing a death in the family (Byrnes et al., 2020; Prayson et al., 2017; Hojat et al., 1999).

In addition to personal life stressors, previous research studies have shown that issues with gender, marriage and children, ethnicity, and personality have also been contributing stress factors for medical students (Drybye et al., 2006; Prayson et al., 2017;). These stressors influence the high rate of depression, substance abuse, struggles with interpersonal relationships, suicide, and burnout experienced by medical students (Prayson et al., 2017; Drybye et al., 2005, Shapiro et al., 2000). These stressors have been shown to impact a medical student's professional effectiveness in their attention and concentration, cynicism, academic dishonesty, poor decision-making, and communication skills (Prayson et al., 2017; Drybye et al., 2005, Shapiro et al., 2000). Lack of stress management skills not only affects the students during their medical training but may transfer into their residency and professional medical practice (Shanafelt et al., 2012; Prayson et al., 2017). While previous studies focused on understanding how psychological development, mental health, and learning environment affected a student's academic success, the focus has shifted to understand how motivation, learning strategies, and academic emotions play a role in the students' learning and academic performance (Hayat et al., 2020). The term academic emotions, coined by Pekrun (2006) was defined as the physiological reactions and responses which are directly related to achievement, activities, and outcome (Hayat et al., 2020).

Management of Personal Wellbeing

Student wellness has become an important focus within medical schools (Dyrbye et al., 2019). Medical student wellbeing is an area of concern as it may affect their ability to provide compassionate patient care in a professional and safe manner (Stewart-Brown et al, 2018). There are multiple constructs which wellbeing can be viewed as, for example, a student's 'coping reservoir' is governed by their personality, temperament, copying style, external stressors, and the social support they may have (Byrnes et al., 2020). Wellbeing as the 'coping reservoir' can also be defined by the instruments used to navigate stress, anxiety, disinterest, motivation, and the learning approaches used (Byrnes et al., 2020).

Medical students are often hesitant to seek help for mental health concerns due to the stigma associated with mental health (Byrnes et al., 2020; Kemp et al., 2019; Prayson et al., 2017; Thompson et al., 2016) and the fear of possible negative consequences to their professional careers for seeking treatment (Byrnes et al., 2020). Many medical programs have implemented wellness within their curriculum to encourage self-care and teach them how to manage daily stressors (Ayala et al., 2018). As it may encourage healthier behaviors as medical students transition into residency and later into practice (Dyrbye et al., 2019). Learning self-care should begin at the undergraduate level when medical students need to learn to balance their academic, teaching, clinical workloads, extra-curricular activities, and social lives, which are major contributors to stress, anxiety and burnout (Picton, 2021). Therefore, is it critical for medical schools to respond to this issue by addressing the stress factors which can be reduced and increase the factors which

can improve resiliency in medical students (Thompson et al., 2016). Medical students are also reluctant to prioritize mental health self-care (Byrnes et al., 2020).

Self-Care

Self-care is defined as a multifaceted health behavior unique to each person, and includes nutrition, physical activity, interpersonal relations, spiritual growth, health responsibility, and stress management (Ayala et al., 2018, p.1). The complex demands which are placed on students during their medical education make it difficult to prioritize the time necessary to maintain personal well-being (Ayala et al., 2018). Promoting self-care is key to reducing the stigma of seeking help for mental health concerns. Students are expected to recognize their own health needs, be aware of their levels of fatigue, and stress management needs (Byrnes et al., 2020). In a study which was conducted as part of an initiative to promote student wellbeing, Australian medical students shared their views on wellbeing and how it influenced their medical educations (Byrnes et al., 2020). These medical students described wellbeing as a multifaceted construct which incorporated balancing their experiences and personal beliefs, balancing academic performance, balancing life circumstances and stress management skills, as well as self-efficacy (Byrnes et al., 2020).

Seeking Help

First generation students are known to be more hesitant to approach faculty or staff for help, while other students found the lecturers unreachable (Malau-Aduli et al., 2020; Quinn et al, 2005). Although students may be informed of the services which are available to them, they may not truly comprehend the benefits of those support services (Malau-Aduli et al., 2020). The authors posit that medical student who experience

academic difficulties may not receive enough adequate support, while others reported that faculty expand large amounts of time and effort to monitor students with academic difficulty (Malau-Aduli et al., 2020). Unfortunately, when students fail to obtain academic support, this has been attributed as a reason for withdrawal (Malau-Aduli et al., 2020), for being referred to Student Progress due to academic failure, and for dismissal (Diem, & Hairrell, 2019). Some students reported that dissatisfaction with the quality of the teachings and the lack of interaction with the academic staff were contributors to them feeling isolated in their academic environments (Malau-Aduli et al., 2020; Blaney et al, 2007). It was reported that there is a need to understand the characteristics and functioning of failing medical students to better support them and to help mitigate their academic difficulties (Malau-Aduli et al., 2020).

Social Support

The quality of relationships that medical students form between other peers and staff has a significant impact on their attitudes (Byrnes et al., 2020). Relationships with more senior medical student peers were said to be very influential to the incoming medical students (Byrnes et al., 2020). Incoming medical students discovered that belonging to a social support group where the students shared similar experiences affected them positively (Byrnes et al., 2020). The support they attained from their peers by being part of those support groups were associated with high degrees of resilience, improved wellbeing, and it encouraged collaboration (Byrnes et al., 2020). The researchers stated that the level of trust found between students, peers, and staff influenced the success of wellbeing initiatives. Previous research has suggested that coaching and supportive relationships created by medical students and medical faculty

and staff may contribute to more successful adaptation of the coping strategies learned (Prayson et al., 2017).

There is a lack of social support in the learning environment which is associated with depression and aspects of burnout (Thompson et al., 2016). The academic factors which were stressors for medical students included exams, time management, high workload, dissatisfaction with lectures, and performance pressure (Weber et al., 2019). Psychosocial resources are considered intrinsic values which are useful as individuals pursue goals and cope with the high demands of life (Weber et al., 2019). These factors include self-esteem, health, skills, knowledge, social support, and may help reduce students' stress levels (Weber et al., 2019). Resources such as joy, optimism, social support, and self-care have been found to reduce perceived stress as well as reduce the negative effects of stress and mental health during a student's medical education journey (Weber et al., 2019).

Medical School Support

Medical school faculty are vital to changing the subjective norms of students when dealing with mental health issues (Thompson et al., 2016). "Faculty development will need to focus on creating a culture that validates the stressful nature of medical training, acknowledges the national statistics on the effects of this stress on medical students, and communicate a clear message about how the institution will respond to and support a student who is having difficulty", (Thompson et al., 2016, p.181). Changing the culture will increase feelings of social support and allow faculty to be more open to address the importance of approach-oriented coping strategies with students (Thompson et al., 2016). In turn, this would allow medical students to feel empowered to alter their

behaviors and to incorporate more care-taking behaviors into their daily lives (Thompson et al., 2016).

It is essential for medical school faculty and administrators to work together to focus on prevention strategies which also identify at-risk students, while helping them to develop care-taking behaviors which increase their help-seeking behaviors (Thompson et al., 2016). Early intervention programs which are structured to assist first-year medical students during their transition into a new learning environment are beneficial to help reduce distress (Thompson et al., 2016). Similar findings suggest that the learning environment needs to be revamped to reduce the levels of distress medical students experience during training (Brazeau, 2014). There is a notable gap in the literature addressing interventions to prevent distress in medical students (Prayson et al., 2017). The need for medical schools to develop interventions for students to build resilience through proper coping strategies and social support which are approach-oriented rather than avoidance-oriented was emphasized (Thompson et al., 2016).

Resiliency and Self-Regulation

Previous research has shown that students who use coping strategies which were more approach-oriented tended to burn out less and suffered fewer mental health issues (Thompson et al., 2016). Resilience strategies to self-regulate behavior is a critical skill that medical students need to learn how to use as physician (Inzlicht et al., 2021). Self-regulation is a term used as a process of determining a desired end state, goal, or outcome, then taking specific steps or action to move towards that outcome while monitoring progress at each step (Inzlicht et al., 2021). Self-regulation requires that an

individual steer their own behavior, thoughts and attitudes, or emotional states, to determine the desired end state (Inzlicht et al., 2021; Nabizadeh et al., 2019).

As previously mentioned, high levels of self-efficacy equal high motivations and high endeavors, this in turn leads to students who are more apt to persevere through the challenges they face (Hayat et al., 2020; Bandura, 2010). Utilizing persistence activities would enhance self-efficacy (Bandura, 1977). Social Learning theory influences the cognitive, motivational, affective, and selection processes of cognitive development which is an essential contributor to academic development (Bandura, 1994; Bandura, 2010). Literature on the topic of self-regulation stressed that a wide array of goal-relevant activities, which includes making the decision to pursue a goal, planning how to pursue said goal, implementing these goals, protecting the goals from apprehensions, and knowing when to abandon the goals (Inzlicht et al., 2021; Nabizadeh et al., 2019). It is important to note that although self-regulation includes engaging in efforts of self-control, it is defined very differently. Self-control is defined as the process of resolving conflict, whether real or anticipated, between goals, and represents only one form of self-regulation, and is seen as conflict-free (Inzlicht et al., 2021). Self-regulation of learning and behavior is an important strategy which medical educators need to facilitate (Prayson et al., 2017). Future physicians must understand the social values and extrinsic contingencies they will experience and transform them into their personal value systems and self-motivation to meet the performance standards required in their profession (Prayson et al., 2017). A recent study showed that students who received mentorship were able to learn how to identify stressors and were able to articulate which resilience strategies to utilize for those stressors (Prayson et al., 2017).

Self-Regulated Learning

Self-regulated learning is a crucial element of student academic performance and achievement and consists of three essential components (Şen, 2016). The components are listed as metacognitive learning strategies, controlling and managing of learning efforts, and cognitive strategies enabling learning (Bandura, 2010; Şen, 2016; Nabizadeh et al., 2019). The first component of metacognitive learning strategies allows for planning, monitoring, and regulating the learner's cognition (Şen, 2016; Nabizadeh et al., 2019; Williams et al., 2019). The second component of controlling and managing stress is that the learner is purposeful with their efforts to perform their academic tasks even when facing challenges (Nabizadeh et al., 2019; Şen, 2016). The third component of using cognitive strategies allows for learning, remembering, and understanding of a subject (Pintrich, & de Groot, 1990; Şen, 2016; Nabizadeh et al., 2019). Schunk and Zimmerman (1997) postulate that self-regulation is a learned socially and begins with parents as the primary models of appropriate behavior.

Metacognitive Learning Strategies

These strategies support the learner to control, monitor, plan, and regulate their cognition (Şen, 2016). Planning activities include setting specific task goals, while monitoring activities include paying close attention and asking questions (Şen, 2016). Regulation activities require that the learner make necessary adjustments and corrections to the cognitive activities based on the assessments the learner makes when in the monitoring stage (Şen, 2016). Previous literature on metacognitive learning strategies stressed that these activities would help the learners make the necessary corrections and control their behaviors, and in turn improve their academic performance (Pintrich & de

Groot, 1990; Şen, 2016). Emotion related learning refers to cognitive, motivational, and behavioral processes used in an educational setting (Hayat et al., 2020). It is a significant factor which plays a role in many areas and may positively or negatively influence a learners' academic achievement (Hayat et al., 2020). Metacognitive learning strategies have been used in qualitative studies in the fields of psychology, social sciences, and education (Pekrun et al., 2009; Hayat et al., 2020;). However, Hayat et al. (2020) mentioned that there was a difference between the learning approaches used by medical students and students from other programs. Academic self-efficacy is an influencing factor in academic performance, as it refers to the students' beliefs and attitudes towards their abilities to achieve academic success (Hayat et al., 2020).

Controlling and Managing Stress

Stress is a contributing factor which influences physical dysfunctions (Bandura, 1994). The ability to control and manage stress is a key principle to managing its effects. Bandura (1994) mentioned that it is not the stressful life situations which cause debilitating stress, rather, it is the inability to manage it. When individuals are unable to control and manage stress, it affects their immune system, increases susceptibility to infection, impacts physical disorders, and may increase the progression of disease (Bandura, 1994). Individuals who effectively manage stress may have a positive influence on immune functions. Perceived self-efficacy can be used to promote healthy lifestyles (Bandura, 1994). Individuals must choose to be intentional in changing their health habits, the stronger the perceived self-regulatory efficacy, the more successful they become at integrating healthy habits (Bandura, 1994).

Cognitive Learning Strategies

These strategies are categorized into two ways, surface learning and deep learning (Şen, 2016). Surface cognitive learning strategies guarantee that knowledge transpires through rehearsal, revision, and memorization, which is transferred into short term memory (Şen, 2016). Deep cognitive learning occurs through the process of elaboration, organization, and critical thinking strategies (Bandura, 1989; Şen, 2016). Elaboration strategies allow the newly learned knowledge to translate into pre-knowledge and encode that knowledge into long term memory (Şen, 2016). Using elaboration strategies allows learners to make summaries, analogies, and take notes to effectively learn the new information (Şen, 2016). Organization strategies consist of selecting the appropriate information, making associations, and then structuring it appropriately. The author stressed that using organization strategies allows the learner to form groups, classify the information, make outlines, and learn the main ideas of the new information. Critical thinking strategies involves that the learner apply the information they have learned to new situations and their ability to make critical assessments relating to the decision-making standards and problem-solving processes (Şen, 2016; Pintrich, & de Groot, 1990).

Gaps in the Literature

Prayson et al. (2017) identify as one of the gaps in the literature, the need to explore and understand the resilience and coping strategies medical students employ to address how they manage their stress and anxiety. The transition from preclinical to clinical training has been found to be a source of stress and anxiety for medical students (Hayat et al., 2020; Malau-Aduli et al., 2020). Previous research has been conducted on

students transitioning from their clinical years into their graduate residency year, however, a gap in the literature relating to the lack of skills training offered to the medical students in their Years 1-2 of medical programs was found. Picton (2021) found that most medical students did not receive any support or advice on how to achieve work-life balance from the university or hospital staff during their training. Thompson et al. (2016) identified another gap in the literature, the need for medical schools to develop interventions for students to build resilience through proper coping strategies and social support which are approach-oriented rather than avoidance-oriented was emphasized. Medical school staff should be more proactive in supporting students to develop strategies and skills which are essential to lifelong learning and help deliver effective patient care. High rates of depressive symptoms and burnout among medical students emphasize the need for more effective preventative efforts and strategies (Rotenstein et al., 2016). Skills such as self-care and work-life balance are important, especially during clinical transition years from undergraduate medical training and graduate residency training (Picton, 2021). Early interventions targeting study skills and time-management may be beneficial in helping medical students.

Summary

Bandura's (1988) theory of self-efficacy and Kelley and Michela's (1980) interpretation of attribution theory are used as theoretical frameworks which will guide this study. Bandura's theory of self-efficacy and social learning theory was used to investigate the components of purposeful management of time, management of stress levels, motivation, and the learning strategies students used when experiencing academic challenges (Rudland et al., 2021; Şen, 2016; Bandura, 2010). Kelley and Michela's

(1980) interpretation of attribution theory as it relates to motivation was used to examine how it influences a learner's well-being, seeking support, and defining specific goals. Both theories are significant in understanding of how osteopathic medical students navigate through challenges during their preclinical years.

Research Questions

How do students in their preclinical years navigate challenges and successfully transition into their clinical years, in an osteopathic medical program at a private university in Florida?

The Research Sub-Questions (SQ)

1. What are the specific strategies used by this group of students that relate to Bandura's theory of self-efficacy?
2. What are the specific strategies used by this group of students that relate to Kelley and Michela's interpretation of attribution theory?
3. What strategies have the students who passed the COMLEX Level 1 reported to have used to be successful on the first attempt?
4. What strategies have students who required more than one attempt to pass the COMLEX Level 1 used to successfully pass the exam?

Chapter 3: Methodology

This chapter describes the method which the researcher used to investigate how osteopathic medical students navigate the academic and personal challenges they faced during their preclinical years and the strategies they used to persist and successfully transition into the clinical years of the medical program. The justification for the research design and the selection process for participants are discussed. Additionally, the data collection instruments, the procedures, and the steps of the data analysis were presented. Finally, the ethical considerations, trustworthiness of the data collected, the potential researcher biases, and the limitations of the study are reviewed. The purpose of this qualitative case study was to investigate the specific strategies used by osteopathic medical students to navigate the academic and personal challenges faced during their preclinical years to persist and successfully pass the COMLEX Level 1 to transition into the clinical years of the medical program in a large medical school in South Florida.

Qualitative Research Approach

Qualitative research is used when the quality or meaning of an experience is the focus of the study rather than numerical data (Locke et al., 2010; Merriam, 2009). The goal of qualitative research is to understand, describe, and discover information rather than to predict or confirm hypotheses, which is the case in a quantitative research study. Utilizing a qualitative research method allows for the participants' voices to be heard (Carter, 2015). Case study research is defined as a qualitative approach where the investigator seeks to explore a real-life, contemporary bounded system which is also referred to as a case or multiple bounded systems also referred to as cases over time, through detailed, in-depth data collection which required multiple sources of

information" (Creswell & Poth, 2016, p. 96). The different sources of information can include observations, interviews, audiovisual material, as well as documents and reports (Creswell & Poth, 2016).

A case study research design is used for this study, as it will allow for the "how" and "why" questions to be answered and clarified during the research (Yin 2014). This approach was determined to be the most appropriate to acquire an in-depth understanding of the strategies osteopathic medical students used when navigating the academic and personal challenges they faced during their preclinical years to persist in medical school. This study included multiple sources of information to allow the researcher to triangulate the findings. The more data sources, the more support the findings will have (Yin, 2014). Individual interviews, an online questionnaire, and archival data of student exam scores allowed the researcher to gather information from various sources to investigate the strategies used by osteopathic medical students to transition from preclinical to clinical years.

Participants

For this study, the researcher recruited two sets of participants--one set to complete the open-ended Strategies for Learning Questionnaire, and another for the semi-structured one-on-one interviews. The focus of this study was on the group of osteopathic medical students who had academic difficulties during their first two years or who did not pass their licensing exam on their first attempt, and how they navigated those challenges. The target population for this study were the third and fourth-year medical students who have successfully transitioned into their clinical years after having academic difficulties. The expectation was to interview two osteopathic

medical students who passed the COMLEX Level 1 on their first attempt and identify the strategies that they used to be successful, two participants who required two attempts to pass the COMLEX Level 1 and identify the strategies they used, and two participants who required three attempts to pass the COMLEX Level 1 and identify the strategies they used. Although there is no exact number identified for sample sizes when conducting case studies, it is reliant on the number of participants needed to answer the research questions (Yin, 2014). The number of participants should provide opportunities to identify themes across the different cases. (Yin, 2014). The goal was to interview two to three participants from each categorized group.

The researcher identified participants utilizing purposeful sampling for those who met the inclusion criteria which required that students self-identify as having faced challenges during their preclinical years of medical school which affected their academic performance, having strategies to navigate through those challenges, having strategies and methods to successfully transition into their clinical years of the program. Purposeful sampling is the process when the researcher purposely selects the participants and the sites to collect data related to the phenomenon (Creswell, 2015). This process is frequently used in qualitative studies (Kalu, 2019) and is found to be the best form of sampling in qualitative research because the researcher can be selective when choosing the participants who can take part in the study based on their knowledge and experiences (Creswell, 2013).

Data Collection and Instruments

Open-Ended Strategies for Learning Online Questionnaire

The researcher used the Modified MSLQ (Soemantri et al., 2018) as a guide to develop a 10-item open-ended Strategies for Learning Questionnaire for Medical Students located in Appendix C. The open-ended questions have been modified to fit osteopathic medical students, because it was not administered for one course, but for all the preclinical courses. The word "course" was replaced with "courses" to increase the appropriateness since students take several courses during a semester. The open-ended online questionnaire was self-administered with the questions presented in standard order to all participants (Braun et al., 2021). Participants responded by typing their responses and hopefully provided rich accounts of the "sense or meaning" making data which qualitative researchers seek to obtain (Braun et al., 2021, p.641).

The Modified MSLQ questionnaire was developed based on the theoretical framework of Albert Bandura's self-regulated learning (SRL) to predict academic success (Smith & Chen, 2017). The MSLQ asked students about their study habits, their learning skills, and their motivation for their courses, and responses are on a 7-point Likert scale where 1=not at all true of me to 7= very true of me. This questionnaire was a self-report instrument that measures motivation, cognitive and metacognition strategies used by students and the different learning strategies used for their courses (Pintrich & de Groot, 1990). The self-report measured student self-efficacy, intrinsic values, test anxiety, and self-regulation. The MSLQ was developed for students in higher education to examine motivation and their learning strategies and allowed for the questions to be modified and used in medical education settings

(Soemantri et al., 2018). Most of the studies on MSLQ which have a medical education context correlate with many of its components within the criteria of academic performance (Soemantri et al., 2018).

Archival Data

Archival data of the COMLEX board score exams allowed the researcher to gain access to identify students who have passed the COMLEX Level 1 on the first attempt, students who passed after two attempts, and students who passed after three attempts. By categorizing the students into groups, the researcher intentionally invited specific students from each group to interview and share the strategies they used to pass the COMLEX exam.

Interview Protocol

The researcher designed the interview protocol to be semi-structured to allow the researcher to follow-up with prompts and probing questions which individualized each interview (Kvale & Brinkmann, 2009). Zoom allowed the interviews to be recorded and transcribed utilizing the Zoom transcribing feature (Zoom Video Communications Inc., 2020). The draft semi-structured interview protocol is in Appendix E.

Table of Specification

The researcher constructed a table of specification to assist in validating the interview protocol questions located in Appendix F. It revealed how each interview question aligned with the research questions. The Strategies for Learning Questionnaire for Medical Students and interview question 8 aligned with Research Question 1. Interview questions 1, 3, 5, 6, 7 aligned with Research Question 2. Interview questions 2a

and 4 aligned with Research Question 3 and interview question 2b aligned with Research Question 4.

Validity of the Instruments

The researcher developed a 10-item open-ended online questionnaire using the Modified MSLQ as a template. The researcher went through an expert-panel review process to validate the online questionnaire. The researcher produced the interview protocol which went through a piloting process after IRB approval. The pilot test refined the data collection tool (Creswell & Poth, 2016).

Validation Process

The validation process of the study involved the researcher submitting the online questionnaire and the interview protocol questions to three experts from the College of Osteopathic Medicine to review for alignment. The researcher made modifications to the interview protocol and the online questionnaire based on the feedback obtained from the experts. The questions were reduced from 34-items to 10-items based on the feedback that the length of the questionnaire were quite long, and there was a concern that students would not complete it if they were open-ended questions. The questions were also changed from present to past tense, because the participants had already completed their preclinical courses. The next step of the piloting process verified the validity of the instruments through pilot testing after IRB approval (Creswell & Poth, 2016).

Piloting

The piloting stage of the study further validated the instruments by interviewing medical students via the Zoom communization application after IRB

approval. The participants chosen for the piloting stage consisted of two students who transitioned into their third year of the osteopathic medical school program. The instrument went through pilot testing by using two participants who were like the participants in this study. This allowed valuable feedback to be obtained and to refine the interview questions, but the data obtained were not included in the formal case study (Yin, 2014).

Procedures

Prior to approval from the Institutional Review Board (IRB) of Nova Southeastern University, the researcher contacted the Dean of the Osteopathic Medical College and requested permission to conduct the study at this institution and recruit participants from the third-year class. With the permission of the Dean obtained, located in Appendix G, the researcher reached out to Assistant Dean of Medical Education and requested access to the archival data of the student's board score exams, and access was granted.

Recruitment

The researcher recruited participants from an osteopathic medical college from a large South Florida institution after receiving the necessary permissions. The researcher worked with the Office of Student Affairs team to send out the Osteopathic Medical Student Flyer (Appendix A) with the Participant Letter and General Consent Form (Appendix B) attached. Recruitment for osteopathic medical students to complete the online Strategies for Learning Questionnaire lasted six weeks. The researcher sent a reminder after week one. The goal was to achieve 60-99 participants. Sample sizes for online questionnaires are larger than conventional qualitative research

studies (Braun et al., 2021). Lower end studies range from 20 to 49, 60 to 99 for mid-range studies, and over 100 for upper end studies (Braun et al., 2021). The flyer was sent out to close 800 medical students, which would be considered a mid-range level study. The goal was to obtain 60 to 99 participants to complete the Open-ended Online Questionnaire. 60 participants were not reached after week two, and therefore the researcher extended the timeline for completing the online questionnaire and sent several reminders. The researcher requested for participants from each of the categorized groups who completed the online Strategies for Learning Questionnaire to provide their contact information if they were willing to participate in a follow-up interview, a minimum of two participants from each group.

The Consent Process

The researcher emailed the participants who shared their personal contact information by emailing the Osteopathic Medical Student Interview Participation Letter (Appendix D) for them to sign. The informed consent form disclosed the details of the interview process, the purpose of the study, the risks, and benefits of participating in the study. Once the consent forms were signed and returned by email, the researcher stored each one in a password protected folder on OneDrive. The researcher will store and keep all data for 36 months from the end of the study and destroy after that time by deleting the files associated with the survey including all responses. The researcher sent available interview dates and times to schedule each participant for one follow-up interview based on convenient times for both parties to meet on Zoom. Once a date and time were mutually agreed on, the researcher sent out a calendar invite with the Zoom information to the participants providing electronic confirmation for the interview.

Data Collection

The researcher sent out an email reminder to the participants 24 hours prior to the interview. All interviews were conducted through Zoom. The interviews were expected to last about 60 minutes on Zoom. Using Zoom allowed the researcher to use the recording and transcribing features. Prior to commencing each interview, the researcher informed each participant how all data collected would remain confidential and names would not be shared. They were also given an opportunity to ask any final questions before beginning the interview. The researcher began by asking demographic questions about the participant such as name, class year, gender, age, and ethnicity. The interviewer utilized the qualitative interview protocol (Appendix F) to conduct semi-structured interviews and used reflective journaling to record important notes. Utilizing reflective journaling is a valuable tool for the researcher to document the progress of the research, any experiences, current mindset, any biases, and current emotional state (Leavy, 2014). Additionally, the reflective journal allows the researcher to describe and explain their thought process effectively and track any moving parts of the study (Leavy, 2014).

Participants were asked the same questions and urged to be detailed in their responses. The researcher asked probing questions to investigate or clarify any responses from the participants. Once all the questions were asked, participants were provided the opportunity to share any additional information or asked any questions. Each participants was thanked for their time and taking part in the study at the end of the interviews.

Data Analysis

For this study, the data analysis focused on understanding the strategies used by osteopathic medical students to navigate the academic and personal challenges faced during their preclinical years to persist and successfully transition into the clinical years of the medical program. Data analysis involves the process of how the researcher organizes the data, reading and memoing emergent ideas, coding and classifying those codes into themes (Bloomberg & Volpe, 2016). The researcher utilized the following steps to analyze the data: preparing and organizing of the data, exploring, and coding, coding to build descriptions and themes, representing and reporting of the findings, and finally, validating the accuracy of the findings. The interview transcripts were transcribed, analytic memos typed and organized, and a decision was made to analyze the data by hand rather than using a computer program.

Open-Ended Questionnaire

Once all the questionnaire responses were compiled and organized, the analyst used these steps described above to analyze the data collected to code and develop analytical patterns and themes across the entire dataset (Braun et al., 2021). The codes were then organized into predetermined theory-based categories. The categories were used to analyze the online questionnaire data. The analyst developed a detailed explanation in a report using the identified themes and exemplary quotes.

Interviews

The analyst transcribed each individual student interview before analyzing the data. The researcher prepared the interview transcripts for analysis and created an audit trail. The audit trail was used as a validation strategy to document the thinking process

and to clarify understanding over time (Creswell & Poth, 2016). The interview transcripts were coded using the following codes to understand the meaning of the data collected from the transcript: descriptive, emotional, and in vivo. Descriptive coding summarizes data in a word or short phrase (Saldaña, 2016, p.102), emotional coding reflects emotions emitted by the participants or inferred by the researcher (Saldaña, 2016, p.127), and in vivo coding is the coding of participants' own words (Saldaña, 2016, p.105). The analyst utilized these codes to identify the meaning of the data collected from the individual interviews. The codes were then organized into the predetermined theory-based categories. The categories were used to analyze the online questionnaire data. The researcher created themes with exemplar quotes from the transcripts and created a matrix of those themes and exemplar quotes. The researcher then developed a detailed explanation in a report using the identified themes and exemplary quotes.

Ethical Considerations

Any research involving human "subjects" raises ethical concerns, especially when it includes personal information, which is why it is critical to first obtain the necessary approvals for how the researcher will collect any data (Yin, 2014). Creswell and Poth (2016) stressed that it is very important for researchers to comply with ethical practices by creating reports which are honest and trustworthy, seeking the necessary permissions, ensuring that the same materials are not used for more than one publication, and disclosing any funders and beneficiaries of the researcher (Creswell & Poth, 2016). Researchers should always conduct their research with the highest ethical standards and sensitivity (Yin, 2009). All participants voluntarily participated in the

study and were able to withdraw at any time without penalty. The researcher provided the participants with all the essential information about the study including the purpose, the research design, the requirements for participation, the possible risks, benefits, and the expectation for those who volunteered to participate in the study through the organization's approved methods. The researcher ensured the security of the data by storing each on a password protected folder on OneDrive. The researcher will also destroy all data after 3 years.

Trustworthiness

Trustworthiness is achieved by establishing credibility, transferability, dependability, and confirmability (Rogers, 2018). The researcher took another step to ensure trustworthiness by using triangulation of the data to corroborate the evidence utilizing interviews and the online survey questionnaire. The researcher took memos and notes while conducting interviews or immediately to capture information. Additionally, the researcher used journaling by making notes throughout the entire process to document thinking and decision-making. When conducting a qualitative research study, field notes and journaling are advised to document the contextual information provided by the participants (Phillippi & Lauderdale, 2018). The more detailed the field notes, the better they will assist the researcher in understanding the participants' lives and contextualizing the responses to the phenomenon being investigated (Phillippi & Lauderdale, 2018). Memoing is also used during this section of the analysis process to explain the rationale used by the researcher when naming the themes. Additionally, the researcher asked an expert to review the data and findings. The researcher will also share the findings with participants.

Member Checking

The researcher established trustworthiness through member checking, which is a significant practice for confirming the validity in a study (Creswell & Poth, 2016). Member checking is done by asking the participants to review their own transcripts to check the accuracy of the information they shared in the individual interviews. The researcher emailed the transcripts to the participants to look over, to add, omit, and edit, and they were given two days to return the transcript. The research continued to complete interviews until saturation was achieved. Both participant 2 and participant 4 did not review or return the transcripts. The researcher used the original transcripts as is.

Triangulation

The researcher utilized triangulation of the data to corroborate the evidence utilizing the data collected from the individual interviews and the online questionnaire. Triangulation allowed for multiple instruments to be used to collect data from multiple sources (Yin, 2014). The researcher obtained a more in-depth understanding of the strategies used by the participants from the different groups categorized by the number of attempts needed to pass the COMLEX boards.

Memoing

The researcher created memos and notes while conducting interviews or immediately after to capture information. This was a critical aspect for the method used and it was conducted consistently throughout the entire research study (Leavy, 2014). The researcher used journaling by making notes throughout the entire process to document thinking and decision-making. When conducting a qualitative research

study, field notes and journaling are advised to document the contextual information provided by the participants (Phillippi & Lauderdale, 2018). The more detailed the field notes, the better they will assist the researcher in understanding the participants' lives and contextualizing the responses to the phenomenon being investigated (Phillippi & Lauderdale, 2018).

Potential Researcher Bias

All research study designs are prone to bias due to the researchers' personal beliefs and prior knowledge of the issue begin investigated (Yin, 2014). Smith and Noble (2014) stressed that researchers must understand that bias occurs in all research designs, across research designs, and is difficult to eliminate. Bias can also occur at any and every stage of the study, and it impacts the validity and reliability of the findings (Smith & Noble, 2014). This can cause misinterpretation of the data and have grave consequences (Smith & Noble, 2014).

In this case study, the researcher has knowledge of some of the challenges which the osteopathic medical students must navigate through due to current employment as the Director of Student Affairs for the College of Osteopathic Medicine and professional experience in working with osteopathic medical students during their four years in the program. The researcher remained open minded and open to differing evidence and results which arose when investigating the phenomenon. This helped to reduce potential bias. The researcher was aware that personal interest in the topic may be a factor for potential cause of bias. The researcher utilized a reflective journal to help in identifying and managing any potential bias throughout the research study. The researcher managed any potential bias during the analysis and finding stage

of the case study by having an expert reviewer review the observation protocol to provide feedback. The experts were from the Office of Medical Education and who work as Academic Advisors to the osteopathic medical students who experience academic difficulty and who are referred to them for academic advising.

Limitations

The target for this study were osteopathic medical students in their 3rd and 4th year of the medical program at a private university. Thus, the findings may or may not apply to students from other osteopathic medical colleges at state universities. Similarly, this study examined the experiences of students in an osteopathic medical college, and it is unclear if the findings will also apply to allopathic medical schools. All interviews occurred through Zoom. By using Zoom, technology or internet issues were additional limitations. Although face-to-face interviews provide a richer interview to better decipher body language, utilizing the recording feature on Zoom allowed the same ability when reviewing the transcripts. Using Zoom also allowed the researcher access to students completing their clinical rotations around all of Florida and other states.

Chapter 4: Findings

The purpose of this qualitative case study was to investigate and identify the specific strategies used by osteopathic medical students to navigate the academic and personal challenges faced during their preclinical years to persist and successfully transition into the clinical years of the medical program in a large medical school in South Florida. The researcher interviewed participants from one osteopathic medical college. The open-ended questionnaires were coded using a deductive coding method as the researcher utilized predetermined categories to analyze and organize the data for Research Question 1 and Research Question 2. The individual interviews were transcribed, coded using multiple cycles of coding, and categorized until themes emerged. The following types of codes were used to identify the meaning of the data collected from the transcript: descriptive, emotional, and in vivo. Inductive coding was used for research question 3 and research question 4. The final section presents the findings with themes and categories organized according to the related questions.

Profiles of the Participants for Online Open-Ended Questionnaire

The table below depicts the demographics of the 57 participants who completed the open-ended strategies for learning online questionnaire. The participants are categorized into three groups based on the number of attempts they required to successfully pass the COMLEX Level 1. Fifty participants were in group 1, five participants were in group 2, and two participants were in group 3. 77% of the participants in group 1 were female, 21% were male, and 2% identified as non-binary. 50% of the participants in group 2 were female and 50% were male. Similarly, 50% of the participants in group 3 were female and 50% were male. 93% of the participants

completed the online questionnaire passed on the first attempt, 7% passed on the second attempt, and 4% passed on their third attempt.

Table 1

Profile of Participants in the Open-Ended Online Questionnaire

Group	Medical class Year	Gender	Age	Ethnicity
1	2023 -17	Male- 11	18 to 24 -6	White - 19
				Black - 2
	2024- 20	Female-41	25 to 34 -29	Hispanic – 7
			35 to 44 -1	Asian – 7
		Non-Binary- 1	45 to 54- 1	Mixed - 2
2	2023 - 2	Male-2	25 to 34 -3	White - 3
	2024-1	Female-2		
3	2024-2	Male-1	25 to 34 -1	White - 1
		Female-1	35 to 44 -1	Hispanic – 1

Profiles of the Participants for Individual Interviews

The six participants were osteopathic medical students. They were assigned pseudonyms to protect their identities. The pseudonyms used were Lance, Tara, Alexandra, Paul, Vanessa, and Maria. All participants signed the consent form and agreed to being recorded for the interviews. The interviewed participants met the inclusion criteria as (a) having faced challenges during their preclinical years of medical school which affected their academic performance, (b) having strategies to navigate through those challenges, and (c) having strategies and methods to successfully transition into their clinical years of the program. The following narrative backgrounds provide an overview of the participant's gender, age, year in the program, the number of attempts they required to successfully pass the COMLEX Level 1 board exam, and the biggest

challenge they had to navigate through during their preclinical years. The demographic details of the interviewed participants are in Table 2.

Table 2

Demographics of Interview Participants

Participant ID	Gender	Medical class year	Age Range	Ethnic Background	Number of attempts to Pass COMLEX 1	Category Group
Lance	Male	M3	25-34	White/Caucasian	2	Group 2
Tara	Female	M4	25-34	Hispanic	3	Group 3
Alexandra	Female	M3	25-34	White/Caucasian	2	Group 2
Paul	Male	M4	35-44	White/Caucasian	3	Group 3
Vanessa	Female	M3	25-34	Mixed	1	Group 1
Maria	Female	M3	25-34	Black/Afro-American	1	Group 1

Lance

Lance was a 25-year-old from the medical class year 2024. He was involved in clubs and held a leadership role during his preclinical years. Lance required two attempts to pass the COMLEX Level 1 exam. He shared that one of the biggest challenges that he had to navigate through during his preclinical years was with how he learned new information, “It’s just hard for me to learn things, I need like a lot of time”, and “If read a paragraph, it's like, I don't know what I’m reading.” He was able to seek professional help. “I saw a psychiatrist when I had my time off, and, I started to take medication, which definitely helped.”

Tara

Tara was a 26-year-old from the medical class year 2023. She was also very involved in club activities and held a leadership position during her preclinical years.

Tara required three attempts to pass the COMLEX Level 1 exam. She shared some of the challenges that she had to navigate through. “I think Covid was really challenging for me. I also think the integrated exams in the beginning were really challenging as well, because they didn't really allow you to focus on one subject. You had to divide your mental priorities a lot more. And I think that was really challenging.”

Alexandra

Alexandra was a 26-year-old female from the medical class year 2024. She was very active in clubs and held several leadership positions during her preclinical years in the program. Alexandra required two attempts to pass the COMLEX Level 1 exam. Alexandra shared that she had to navigate through two different and separate challenges, during preclinical years. “My first year, I was used to getting straight A’s all the time, and I think that I was used to having a set way of reviewing lectures and grasping concepts pretty easily, and studying for medical school was a little tougher.” “I also had the issue with student progress, and that was huge. I don't want to call it detrimental, but it was a huge character shaking thing. I had never experienced anything like that, and to have it happen right before studying for boards definitely wasn't helpful.”

Paul

Paul was a 36-year-old male from the medical class year 2023. He was the only participant who was married with three children. He shared, “I’m an older applicant”. Paul was also very active in clubs and held several leadership positions during his first year of medical school. He required three attempts to pass the COMLEX Level 1 exam. Paul shared several challenges he had to navigate through during his preclinical years of medical school, “one struggle was because of my dad, he passed away two months before I started medical school. Two, I think, this by far was the biggest challenge that I faced, I

got sent to the student progress because somebody accused me and my colleagues of having pictures of exam or quiz material on our decks."

Vanessa

Vanessa was a 26-year-old female from the medical class year 2024. She was very active in clubs and held several leadership positions during her preclinical years in the program. Vanessa required one attempt to pass the COMLEX Level 1 exam. Vanessa shared that her biggest challenge when starting medical school was that "I forgot how to sit down and actually study, getting back in the groove of studying and figuring out how, and remembering how I learned best- was one of the biggest challenges for me."

Maria

Maria was a 30-year-old female from the medical class year 2024. She was very active in clubs and held several leadership positions during her preclinical years in the program. Maria required only one attempt to pass the COMLEX Level 1 exam. She shared, "balancing time was the hardest for me, because I was just mostly only studying, and then if I got tired of only studying, I would hang out a little bit, but then I would just go back to only studying, so I think more balancing time."

Presentation of the Findings

The central question for this qualitative case study was as follows: How do students in their preclinical years navigate challenges and successfully transition into their clinical years, in an osteopathic medical program at a private university in Florida? The following responses were shared by the participants to address the supporting research questions below:

1. What are the specific strategies used by this group of students that relate to Bandura's theory of self-efficacy?

2. What are the specific strategies used by this group of students that relate to Kelley and Michela's interpretation of attribution theory?

3. What strategies have the students who passed the COMLEX Level 1 reported to have used to be successful on the first attempt?

4**.** What strategies have students who required more than one attempt to pass the COMLEX Level 1 used to successfully pass the exam?

This case study research design was used to acquire an in-depth understanding of the strategies osteopathic medical students used when navigating the academic and personal challenges they faced during their preclinical years to persist in medical school. The codes and categories are organized based on the research question they affiliate with, to present the findings which emerged from the online open-ended questionnaire and the interview transcription data.

Research Question 1

Research Question 1 asked, "What are the specific strategies used by this group of students that relate to Bandura's theory of self-efficacy?"

This question explores how students navigated through challenges to investigate the components of purposeful management of time, management of stress levels, how they perceive themselves, and the learning strategies used and to understand to what extent they used the elements related to Bandura's theory of self-efficacy and social learning theory (Rudland et al., 2021; Şen, 2016; Bandura, 2010). Once the data was collected, the researcher coded the 57 online responses using the three coding cycles.

There were ninety-nine codes pulled from the raw data set, which were organized into seven predetermined theory-based categories (see Appendix H) which were directly related to the elements from Bandura's theory of self-efficacy. These categories are (a) purposeful management of time, (b) analyzing and applying information, c) elaboration strategies, (d) organization strategies, (e) self-regulation, (f) learning strategies, and (g) did not seek academic support. Three themes were developed related to this research question, (a) self-efficacy, (b) critical thinking strategies, and (c) self-regulation of learning.

Table 3

Themes and Categories Answering Research Question 1

Themes	Categories
Self-Efficacy	Purposeful Management of Time
Critical Thinking Strategies	Analyzing and Applying Information Elaboration Strategies Organization Strategies
Self-Regulation of Learning	Self-Regulation Learning Strategies Did Not Seek Academic Support

Self-Efficacy

This element revealed how students perceive themselves, how they motivate themselves, and how they reflect on their learning. Thirty-two of the 57 participants shared how they kept themselves motivated by using reminders and rewards, regulated their time, and shared the learning strategies they used to be successful. Purposeful management of time also helped to keep students accountable. One Caucasian male

participant from group 1 who completed the online questionnaire expressed, “I would remind myself that if I stayed on course and studied hard during those two weeks before an exam, that after my exam I could hang out with friends, go to the beach, and relax for a weekend.” Similarly, an Asian male participant from group 1 shared, “I used to tell myself to get x- number of lectures done in a day before doing anything else.” Many of the participants responded that they structured their studying and their time with responses such as “time management”, “attend study tables”, “watched online lectures only”, “control learning at my own pace”, or “watching lectures at 2x speed”. Medical students with children had different challenges to deal with when it came to studying at home. A Caucasian male participant from group 1 stated that, “I knew I couldn’t study at home because of family life so I just got it done every day (at school).” Another Caucasian male participant from group 1 stated, “I squeezed in studying between patients, while driving, and between changing dirty diapers.” Additionally, a Hispanic female participant from group 1 who completed the online questionnaire provided more details by explaining their strategy:

> I used a planner to write down what I would study every day, as well as mark down important deadlines to adhere to studying. I also used a timer to help coordinate breaks while studying so I wouldn’t burn out.

During the analysis of the online questionnaire, student attitude was found to be an important element needed to be successful in medical school. This is categorized under self-efficacy, as it deals with a student’s beliefs, it determines people feel, think, motivate themselves, and behave. This is seen in how the participants responded to the questions and the words which they used. As noted in an analytical memo, some students

used passive words such as "try to", or “I tried to”, “if provided”, while others used action words such as "I made", "I created", "I planned", "I used" to describe the strategies they used during their preclinical years.

Critical Thinking Strategies

Forty of the 57 participants have displayed and used critical thinking strategies which involves how they applied the information they learned during their preclinical years in how they make critical assessments in their decision-making, in their problem-solving processes, and in their clinical rotations. These behaviors were expressed in how they thought, how they processed information, and how they made decisions and were displayed in how they studied, prepared for exams, and how they utilized the information learned during their preclinical years. Another Hispanic female participant from group 1 explained, “I used the knowledge during clinicals and my patients’ presentation in turn reinforced what I learned in class”. A mixed-race male participant from group 1 shared, “I was able to see many pathologies discussed in previous lectures and having a baseline knowledge before seeing it in real life helped me fortify my understanding”. A Caucasian female participant from group 1 expressed, “I feel like those experiences helped during studying during M1 and M2 year.” A Hispanic female participant from group 3 shared, “I was able to diagnose depression multiple times using mnemonics and other methods in class.” A Hispanic Female participant shared, “PCM discussion style classes were helpful to learn how to present cases and work on differential diagnoses, this was one of the most helpful courses to prepare me for presenting in the hospital and clinic to preceptors.” In an analytical memo, the researcher noted that it seems that students who were able to

apply deep cognitive learning strategies were able to perform well on their board exam and pass on their first attempt.

Self-Regulation of Learning

Forty-seven of the 57 participants shared how they regulated their studying, their time, and their progress. Participants shared that they used outside resources to help with their studying. If a class lecture was difficult to understand, one Caucasian female participant from group 1 stated, “I would look for outside resources, particularly videos, explaining the concepts another way.” A Hispanic female from group 1 shared, “I used outside resources like First aid, Amboss, online medical education videos, and YouTube videos to help understand bigger concepts and apply them to the course work.” A Caucasian male from group 3 also shared their strategy for learning difficult information, “I used additional supplemental resources such as Lecturio (or seldomly Osmosis), YouTube, fellow study partners, Master of Biomedical Science tutors, or as a last option, sometimes I’d ask other classmates outside of my normal study trio.”

Of the participants who completed the online questionnaire, 70% shared that they used outside supplemental resources to help them with better understanding of newly learned information when the topic was difficult to understand. Once Caucasian male from group 1 shared, “I always used Lecturio and Pathoma to learn all material initially. For difficult material I simply dedicated more time to understanding concepts and the material.”

Organization is key when learning large amounts of information. The following excerpts were taken from the raw data to illustrate strategies used during their preclinical years which helped students maintain or improve their academic performance.

Participants shared that they “used a planner”, or “made a schedule for myself”. One Asian female from group 1 shared that, “writing out to-do lists and keeping a calendar of tasks to keep up with studying. A Caucasian female from group 1 shared:

> I made a checklist of what topics I wanted to cover each day, so that once I was able to cross off everything on my list, I could have time to do enjoyable things like going out to dinner or working out.

A Caucasian male participant from group 1 shared that their strategy was to “review lecture handouts prior to attending lecture, which allowed me to have a basis on what to focus on and where to ask for clarification.” One Asian female group 1 shared their strategy:

> I would go through the lecture alone, use supplemental information like Pathoma and consolidate the entire lecture into one paper that summarized everything high yield. Then I would teach the lecture to a classmate. This would provide me with multiple reviews of the same material and build my foundation. I would go back and re-teach myself the material and use supplemental information to fill in gaps.

Three participants, one Asian male, Caucasian female, and one Caucasian male from group 1 shared responses that they used the Pomodoro method when studying. The Caucasian female elaborated, “I used the Pomodoro method often, I would spend twenty-five minutes studying, take five minutes off, and repeat.” The Asian male participant further explained:

> I used the Pomodoro method to stay focused. First watch lectures by professors that emphasize more high yield points and board material then if I have time I'll watch the other lectures otherwise, I will just memorize the slides without

watching lecture. While watching lectures, I would make sure I understand the material and make flashcards alongside.

The data that resulted from this sample supports Bandura's theory of self-efficacy, as the subthemes of self-efficacy, critical thinking, and self-regulation of learning all relate to how students regulate themselves to steer their own behaviors to attain the desired end goal. Forty-eight of the 57 participants who completed the online questionnaire all responded that they used self-regulation of learning strategies to navigate challenges and successfully transition into their clinical years of osteopathic medical school.

Research Question 2

Research Question 2 asked, "What are the specific strategies used by this group of students that relate to Kelley and Michela's interpretation of attribution theory?"

This question explores the strategies students used during their preclinical years of medical school and to understand the extent they used the elements related to Kelley and Michela's (1980) interpretation of attribution theory. The data from the 57 online responses were also analyzed and coded using the three coding cycles. There were sixty-eight codes pulled from the raw data set and organized into the following eight predetermined theory-based categories (see Appendix I) which were directly related to the elements from Kelley and Michela's (1980) interpretation of attribution theory: (a) working with peers, (b) seeking faculty support, (c) seeking family support, (d) seeking professional help, (e) well-being, (f) goal oriented, (g) internal motivation, and (h) internal abilities. Two themes relate to this question, (a) feedback seeking and (b) internal goal orientation.

Table 4

Themes and Categories Answering Research Question 2

Themes	Categories
Feedback Seeking	Working with Peers Seeking Faculty Support Seeking Family Support Seeking Professional Help Wellbeing
Internal Goal Orientation	Goal Oriented Internal Motivation Internal Abilities

Further analysis of the data revealed that seeking help from faculty and peer learning strategies were heavily utilized by 22 of the 57 participants. Peer learning and help seeking were then merged into feedback seeking because both factors look at how students seek help and how they incorporate the help they obtain from faculty or from peers to monitor their own learning.

Feedback Seeking

Thirty-seven of the 57 respondents pointed out how they worked with each other, by quizzing, testing, and encouraging each other. One Asian male from group 1 noted, that he "engaged in structured group study with 2-3 people". An Asian female also from group 1 shared, "I would ask my classmates that I studied with for clarification on topics I would be uncertain about", and another participant, Caucasian female also from group 1 noted, "I leaned on my fellow students for support". While many students opt to navigate academic challenges by seeking help from their peers, seventeen respondents indicated that they sought out help from their medical education faculty for support on study

strategy skills, organization, time management, and emotional support. An Asian female participant from group 1 shared:

> When I was struggling academically, I reached out to a professor and club mentor for one of the clubs I served on the board of. She was so kind and understanding and really took the time to tell me exactly what steps to take when I explained how overwhelmed I was feeling. Honestly, it felt like the first time someone at the school really cared about my mental and physical health and me as a person.

A Caucasian female participant from group 2 shared, “They also provided tons of emotional support”. Two of the participants shared the importance of having the support from their family members, specifically their parents. Another Caucasian female from group 1 shared, “I didn’t really search for support from school staff, though they provided me with resources for board studying; a lot of my support was emotional support from fiancé and friends also studying”. The researcher noted that the participants who sought help and sought feedback from medical faculty seemed to perform better than those who did not seek help at all.

Internal Goal Orientation

Thirty-seven of the 57 participants who completed the online questionnaire shared that setting goals for themselves helped them to remain focused. A Caucasian female from group 1 noted, “I do well with weekly goals.” Another Caucasian female from group 1 stated, “I just set goals for covering a certain number of topics each week. I was rewarded with breaks and social time”. A third Caucasian female from group 1 elaborated, “I would make fun plans for the weekend and set a goal of how many lectures

I wanted to get done before that event." One respondent shared, "I had to hit a certain amount and it had to be meaningful".

Fifty-five of the 57 respondents who responded to the questionnaire utilized positive vocabulary when responding to the online questionnaire. Looking forward to getting into the medical workforce was a motivating factor for four of the online questionnaire participants. They shared that they were motivated by knowing that soon they would be transitioning into the "real world" of medicine. A Hispanic female from group 1 stressed, " I just to do the best I can every day". A third participant, an Asian male, shared, "I had my goals set high, so that I may land lower". An Iranian female from group 1 noted that they were "mainly motivated by the pressure of needing to do well".

Understanding their abilities and why they were experiencing challenges was important to a Caucasian female participant from group 1. She expressed:

> I Took a second to regroup and assess why I was having difficulty concentrating- usually it was because I was hungry, thirsty, or had other outside distractions at home. I also made it a point to sit in the front row so I wouldn't be distracted by seeing other students' screens.

Kelley and Michela's interpretation of attribution theory supported the data that resulted from this sample, as the subthemes were feedback seeking and internal goal orientation which relate to how a learner uses motivation to seek support and define their personal goals. Thirty-seven of 57 participants who completed the online questionnaire shared that they used feedback seeking strategies and 31 of the 57 used internal goal orientation strategies to help them navigate through challenges of medical school during their preclinical years.

Research Question 3

Research Question 3 asked, "What strategies have the students who passed the COMLEX Level 1 reported to have used to be successful on the first attempt?"

Research Question 3 explores the learning strategies used by students to prepare for the COMLEX Level 1 and successfully passed on their first attempt. There were 108 codes pulled from the raw data set and organized into 19 categories (see appendix J). These categories were then placed into the following four themes which relate to this question: (a) learning strategies, (b) self-regulation, (c) purposeful management of time, and (d) work-life-balance. These themes were identified in the individual interviews and the open-ended online questionnaire. The following section includes direct quotes from the two interviewed participants and the data gathered from the online questionnaire that exemplify the identified themes.

Table 5

Themes and Categories Answering Research Question 3

Themes	Categories
Learning Strategies	Learning Strategies Learning Challenges Testing Strategies Analyzing and Applying Organizing Strategies Elaboration Strategies
Self-Regulation of Learning	Self-Regulation Seeking Faculty Support Internal Motivation Internal Abilities Goal Oriented Thoughts and Attitudes Working with Peers Using Additional Resources
Purposeful Management of Time	Time Management
Work-Life-Balance	Personal Well-being Prioritizing Mental Health Self-Care Time with Family

Learning Strategies

Vanessa and Maria were among the 50 who were willing to elaborate on their responses during the follow-up individual interview on the strategies they used which attribute to their passing the COMLEX Level 1 on their first attempt. They both explained that gaining skills in strategic learning is attributed to their success. Vanessa shared that:

> I feel, by being targeted in my approach to the test taking skills and what they were asking, why they were asking and figuring out the differential that they were trying to identify in the questions, and how they were trying to trick me. When I did the questions, I found that my grades improved quicker than my peers, because when I would go through the board study course, I would make sure- I read the answer choices, and towards the end of my studying I could predict based on the answer choices what the question was asking.

Additionally, Maria communicated:

> What helped me was the OPP, the OMM concepts, getting them down gave me a lot of time cushion, because sometimes I didn't have to like sit down there and decipher what the question was really asking if I knew what the OMM technique was or what they were referring to organ system wise, that made it a lot more helpful.

In the online questionnaire, Vanessa responded to the learning strategy she used, skimming lecture notes for overarching themes, then watching lectures and writing notes. A third pass with the material reviewing it was great if I had the time. Maria also responded that she used Anki, U-world, True Learn, Boards and Beyond, and First Aid as the specific learning strategy which she implemented when learning exam and lecture material. One respondent shared, “I made my own study guides for each lecture hour, and I used that time to try and decide what was truly the most important info in the lecture.” While another participant explained that “I created study guides on Google Docs with one of my friends. We would format it ourselves, listen to lecture & type as we listened, then later added in extra points from the PowerPoints and other outside study materials (First Aid, Pathoma, Sketchy, Boards and Beyond, etc.)”.

Self-Regulation of Learning

Both Vanessa and Maria shared how they regulated their studying, time, and their progress. They also shared that they used outside resources to help with their studying. Vanessa explained the strategy she used if a class lecture was difficult to understand, "For one course, I would watch the lectures twice. Once at regular speed and then a bit faster and take notes so I could really understand how it worked. Then I'd review the notes at least once or twice." Similarly, Maria shared, "Watching videos from Osmosis to assist then rereading the material" helped her. She also stressed, "Lecturio helped with reinforcing some information."

Purposeful Management of Time

Maria shared that balancing her time was very difficult during her preclinical years. She used the following strategy to purposely manage her time by creating a schedule, "at the beginning of every week, I write out my to do list of things that I have to do, and it works for the most part, sometimes I procrastinate but still get it done right before it's due." Vanessa shared her strategy on how she organized her study time:

> The day of an exam I would always go to a study room and then force any last bits of productivity out. My first order of business was to count how many days (excluding weekends) that I had until the next exam and then how many lectures we had on that exam. I'd do some simple math and remind myself during the week that if I wanted to only review the weeks' material and not need to "catch up" and learn more content that I'd need to stay motivated.

Work-Life-Balance

Attaining work-life-balance is critical for students to learn how to study and manage their time effectively to attain a balance between their various familial and educational obligations. Vanessa stated, “I feel like a lot of times, people struggle with life stressor like laundry and cleaning your house, and just kind of navigating home life”. For this participant, scheduling how she spent her time was important. She shared:

> I know my fiancé’s day off is Tuesday, so I’ll work through the weekend and take a Tuesday off or another good day off, or instead, structure my time where I get all the work done. I spend the time studying, and doing research, and contributing to my other commitment.

Additionally, Vanessa mentioned:

> “My family is a priority to me. I don't really spend very much time with friends outside of school. So, if we went to lab, I would see people, but I don't hang out with people outside of school very often. Spending time with family, I have a ten-year-old brother, hanging out with him and playing board game, watching even kids’ movies, I love kids, so just doing something like that and exercising when I can.

Maria shared:

> “I don't plan enough time and for like relaxation, but if I didn't have for free time, I would just vocalize it, and then I would wait till I had free time, and I would just dedicate all that time to just doing all the things I may have neglected during the exam week. Throughout the week I would make sure I would be doing some of my responsibilities, little by little, so that they wouldn't pile up.”

The data that resulted from this sample were supported by several of the elements from Bandura's theory of self-efficacy. Forty-nine of the 57 online questionnaire participants, including the two interviews participants who passed the COMLEX Level 1 on their first attempt have reported using different learning strategies, purposefully managing their time, utilizing self-regulation, and work-life-balance strategies which all fall under self-efficacy. As previously stated in chapter 2, self-efficacy is believed to be an important factor which influences student academic success and is a strong predictor of future academic performance during their preclinical years (Hayat et al., 2020). The greater the perceived self-efficacy, the more effort will be used to attain the end goal.

Research Question 4

Research Question 4 asked, "What strategies have students who required more than one attempt to pass the COMLEX Level 1 used to successfully pass the exam?"

Research Question 4 explores the learning strategies used by students who required more than attempt (two or three) to successfully pass COMLEX Level 1. The participants faced a variety of challenges throughout their respective preclinical years. The transcripts from four of the interviews were analyzed to arrive at the results for this question. The analysis resulted in 305 codes, which we grouped into 38 categories (see appendix K), and these were reduced into 9 subthemes. The nine subthemes which emerged from the data connect with the four participants' navigation of challenges: (a) learning challenges, (b) thoughts and attitudes, (c) self-regulation of learning, (d) staying motivated, (e) support from faculty, (f) support from peers, (g) seeking professional help, (h) mental health and personal well-being, and (i) COVID-19. These subthemes were then placed within the following three themes*:* (a) understanding your needs and (b)

seeking help at the right time, and (c) navigating unexpected challenges. The three themes above emerged in the analysis of the four individual interviews. But in line with the case study research design, where corroboration of the results is sought from multiple data sources, evidence for these themes was also sought in the open-ended online questionnaire. The ensuing section includes direct quotes from the four participants and the data gathered from the online questionnaire that exemplify the identified themes.

Table 6

Themes and Subthemes Answering Research Question 4

Themes	Subthemes
Understanding your Needs	Learning Challenges Thoughts and Attitudes Self-Regulation of Learning Staying Motivated
Help at the Right Time	Support from Faculty Support from Peers Seeking Professional Help Mental Health and Wellbeing
Navigating Unexpected Challenges	COVID-19

Understanding Your Needs

This theme resulted from responses which highlighted the specific needs of the participants and what they shared were important to them ensure their academic success. Seven participants who required more than one attempt to pass the COMLEX Level 1 completed the online questionnaire. Lance, Tara, Alexandra, and Paul were willing to follow-up with the individual interviews to further elaborate on their online questionnaire responses.

Learning Challenges. All the interview participants, Lance, Tara, Alexandra, and Paul shared that they navigated through learning challenges. They all expressed the need for more time to either process information or to go through the question banks. Lance shared, “I needed to start studying right away, while my friends could take a week off”. He further explained that when studying for exams, “I need like a lot of time, I just need like a lot more time.” Tara explained, “I'm a visual learner” and admittedly stated that “I did not do enough questions the first round.” She also explained, “I have very severe testing anxiety and it's very hard when no one's guiding you.” Tara noted:

> Incorporating some board materials earlier on would have, maybe not first year, but definitely second year, heavily incorporating board review questions and maybe using the first aid book and things like that to kind of parallel what I’m studying would have helped.

Alexandra expressed the need to change her way of studying for her courses during her first year of medical school. She noted:

> I was used to having a set way of reviewing lectures and grasping concepts pretty easily, and medical school was a little tougher. I definitely had to incorporate things like flash cards and ANKI, because I never used those before. I did this towards the beginning of my second year, which was when I started doing a lot better. My class rank skyrocketed from my first to second year.

Alexandra explained that if she could do things differently. She elaborated that:

> I would probably incorporate things that made studying more efficient, like Anki and such like that. I used outside resources like sketchy and boards and beyond,

> but I probably should have used more because I tended to only focus on things the professors would say, and I didn't grasp concepts as a whole.

Alexandra shared that the beginning of her first year was challenging, because she was always used to performing well academically, and not doing well was almost a shock to her. She indicated:

> I did several types of questions I started with Amboss and I did those pretty much daily, but I didn't think I was getting anything out of it. I also did some U-world, but again, what I would do is I would answer them, take what the answers they gave me and try to learn that concept.

Paul shared his learning challenge:

> I process things more slowly. I don't have any diagnostic conditions, but I process things way slow. Most people could get through easily forty questions a day, and for me forty was a struggle that was like ten hours a day, and I'd only get through forty questions, so U-world's Queue Bank is like three thousand four hundred questions, and I just struggled to get through all of them and the explanations. It was just. It took me a long time to get through the questions.

For his third attempt, he indicated, “I needed some sort of aid to help me recall, I noticed I would forget the information fairly quickly, because I was covering so much. But he also realized that there was more that was affecting his test performance. Paul noted:

> I decided that I needed some sort of aid to help me recall, but it's not just relying on my sheer grip power of memory and recall. I developed a mind map and how the different locations on campus help me with recall and diagnosing patients

> based on their complaints. You know what, this mind map approach, this really works for me.

Two of the four participants shared that they experienced testing anxiety during their preclinical years. Lance stated, “I think part of it's just my testing, and I have a lot of anxiety when it comes to testing”. Similarly, Tara shared, “I have very severe testing anxiety and it's very hard when no one's guiding you”. She mentioned that she needed testing strategy skills and sought professional help to attain those skills. After several failures, Paul shared in a direct quote “now, I've really developed a lot more, my emotional intelligence and mindfulness. So, I’m much more aware of where I’m at in terms of burnout level, and how much I’m pushing myself.” He also shared that:

> The thing I did to stay motivated, was honestly going to Clinic was kind of the motivation in and of itself, because studying in books is not as fun as talking to people and actually seeing it in person.

Thoughts and Attitudes. All seven participants who completed the online questionnaire and required more than one attempt to pass the COMLEX Level 1 faced challenges in how they believed in themselves and their internal abilities. Lance mentioned several times, “it’s just hard for me to like learn things.” But then realized he had to do things differently the second time around, to be successful on his second attempt. He sought professional help which may have been attributed to his success. Tara made comments such as, “transitions was really hard” and “it’s very challenging”. One online questionnaire participant who required two attempts to pass responded that they “tried to keep up” when they found themselves missing important points because they were distracted or unable to focus on the topic at hand. During her first year in the

program, Alexandra felt that her studying efforts were not being rewarded with the grades she was earning. She expressed the need to change her way of studying:

> I definitely had to incorporate things like flash cards and ANKI, because I never used those before, and I did this towards the beginning of my second year, which was when I started doing a lot better, as well as group studying and making friends. Then my class rank skyrocketed from my first to second year.

After two unsuccessful attempts at the COMLEX Level 1, Paul too realized that he needed to do something differently. He stated, "I am capable of doing this test. But there's something that I'm not addressing that needs to be addressed", this is when he took the steps to seek professional help. The researcher noted in a memo that the key is to be self-aware of one's emotions. Paul explained:

> Therapy helped me to figure out, you know what-" I am capable of doing this! I'm driven to do this." When I came back from my leave of absence, and retook the exam, I ended up increasing my score 113 points.

Self-Regulation of Learning. Paul shared, "it was really hard to focus." He explained that he failed the COMLEX Level 1 a second time, "after three months' worth of hardcore studying and going to rotations." Paul explained one strategy which did work for him:

> I had a certain number of lectures to view, Anki cards to make, and then required myself to get through all of that day's lecture's Anki cards as well as review all prior lecture cards (if they were due for review according to the spaced repetition algorithm). If I missed a card, I would add some images from either the lecture

slides or online images from Google which helped clarify the topic and helped me understand the point better.

Lance explained that he could not study the same way as his peers, “using Anki flashcards has been the best tool for me, that has worked since college. Other methods have not worked. I need more repetition.” He also mentioned, “I watched lectures online so I was able to pause and play and I would drink a lot of coffee”. As noted in the following memo, this student was not as strong academically as his peers, however, his learning process improved in his second year in the program. Repetition was a critical part of that process, as he stressed many times that he required constant repetition to retain new information.

Tara shared that “I would go back to the lectures and review relevant information”. She also mentioned, “incorporating more space repetition when learning was helpful”. Alexandra also mentioned, “I did use sketchy, that was hugely helpful”. In the online questionnaire, Alexandra responded that when the topics were difficult for her to understand, she leaned on her peers and outside resources to help her learn the information in a different way. Additionally, as noted in a memo when analyzing the interview data, learning to prioritize seemed to be a challenge for this student. Understanding her learning style was key to her navigating through challenges. In an additional memo, the researcher noted- there seemed to be a sense of realization that she did not do enough for her first attempt. Meaning that she did not prepare enough by completing more practice questions. In a third memo, the researcher noted that both Lance and Tara attributed that completed the practice question banks were key to them successfully passing the COMLEX Level 1.

Staying Motivated. Through their failures, all seven participants who required more than one attempt to pass the COMLEX Level 1 shared how they kept themselves motivated. Lance stated, “I think I'm really honest about where I am academically and mentally, and everything, and I think, just trying to do as much as I can motivates me.” Additionally, he shared that “my goal is to get an A on everything, one hundred, but it's always, ultimately, just trying to pass, and that's what kind of keeps me motivated.” In the online questionnaire, he responded that he, “just kept going and trying to do the as much as I could” as a goal to keep himself motivated. Similarly, another responded mentioned, “I would spend time with friends so we could motivate each other to keep studying, especially in first year.”

All four participants indicated that working in the real world was a real motivator for them. Tara shared that:

> What kept me motivated was that eventually I’d be done with my preclinical years. Now the learning would be a lot more hands on, and not as textbook based. And I think that's where I thrive, the art of medicine, sometimes more so than the science of medicine. Just knowing that I’d actually be in the ‘real world’, I guess, to say, you know, working with other students and physicians and nurses and other staff, and just actually applying my knowledge. That was what motivated me to kind of get through it.

Alexandra also shared that she looked forward to getting into the clinical settings. She shared this in a direct quote:

> Actually, it was really nice to be put in the real world, so not a lot of motivation was needed. Um, It was very encouraging to be like, okay, this is what you're going to

use in the real world. And this is what you want to achieve, so having that in front of you was a motivator in itself.

The data indicated that all four participants faced challenges in regulating their learning and motivating themselves, which relates to Bandura's theory of self-efficacy. The students who required more than one attempt to pass their COMLEX Level 1 seem to have low self-efficacy as they struggled with self-doubt, motivation, and knowing how to regulate their learning and they required professional help. However, as noted in a memo, it seems that when students are reassured that they were not alone when facing challenges, this helps them to stay motivated and to keep persisting in their medical school journey. Encouragement through community with those who shared similar experiences. As mentioned above, self-regulation is a critical factor which students need to navigate their own behavior, thoughts and attitudes, or emotional states, to determine the desired end state (Inzlicht et al., 2021; Nabizadeh et al., 2019).

Help at the Right Time

This theme arose from the categories relating to the need to seek and obtain support during medical school. All seven of the participants in both the online questionnaire and the four individual interviewed participants who did not pass the COMLEX after one attempt were required to work with a medical school academic advisor.

Support From Faculty. Tara shared her experience with her academic advisor "she always prioritized my mental health before anything." She shared her thoughts about her academic advisor:

> I think that just really relying on your support system, having a good group of people, and having someone like my advisor from the beginning would have been incredibly helpful. She always supported me, always saying text me whenever, she gave me her personal cell phone number, and she gives it to all her students, making sure if I needed therapy, providing available resources for my mental health. She explained that my mental health was the most important and that I wasn't alone, that there were other students in my situation which helped me tremendously, I wish there were a hundred of her in our administration.

In the online questionnaire, Tara also responded:

> The only ones who provided help or guidance were my academic advisor and one of the medical school staff. They were very understanding of my situation and provided me with empathy. My academic advisor was the only one who had my back both times, listened to me cry, and helped prioritize my mental health and healing. She provided resources that were imperative to my success.

One online questionnaire participant mentioned, “I had several meetings with the academic advisors who helped lay out study strategies for COMLEX Level 1”.

Although Lance was required to work with an academic advisor, he did not find them helpful. He shared, “I don’t think anyone from medical school staff influenced my passing of my courses and COMLEX.” In the interview, he elaborated that, “they would tell me to do things that's like, do this, try this technique, or whatever, and in theory, I guess in trying everything you'll probably find something, but I think Anki is the best thing for me.” Seeking professional help was what eventually helped him the most.

In the online questionnaire, Alexandra pointed out that “I didn’t have much contact with staff while studying for my first attempt but during my second attempt staff members reached out and checked in every so often to check my progress. They also provided tons of emotional support.” During the individual interview, she mentioned that her academic advisor was very helpful during her time preparing for her second attempt at the board exam.

In the online questionnaire, Paul stressed:

> My academic advisor was very helpful in her approach to study design. She helped me break down my goals into a weekly and daily amount which was doable, and because of her clinical background, she understood the complexity of working in clinic during the day and how much could realistically be studied at night. The non-clinical academic counselors just never were understanding of this challenge and were never able to adequately give me useful advice to manage such a situation, which was why after my first failure, I was granted support by a physician. I am so happy she worked with me.

During his individual interview, he stressed that he sought professional help after two COMLEX Level 1 failures. The researcher noted in a memo that both Lance and Tara made similar comments stating that medical school administrators need to help struggling students more efficiently. Lance felt that medical educators need to know the learning style of the students who are struggling to better assist them.

Support From Peers. Thirty-seven of the 57 participants who completed the online questionnaire worked with peers to help elaborate on difficult topics, study, and prepare for their exams. Three of the interview participants, Alexandra, Tara, and Paul

indicated that creating a supporting network of friends, family, and mentors is critical during the medical school years. One advice that Alexandra shared:

> The biggest thing that I could say is to make a group of friends who you can definitely come to, because no one else will understand the struggles you're going through except the other students who are doing it with you.

In another example regarding the need for support, Tara mentioned:

> I have a few very tight knit friends in medical school that even though they weren't going through the same thing per se. They were always there whenever I needed something, like hey! I really don't understand this concept, or can I talk this through with you? They'd always be willing, and they never made me feel dumb for asking.

Paul also mentioned that the support of his peers helped him navigate through the challenging time of his second year. He stated that:

> When I was facing the accusation with student progress, I mean, I really stepped into my fellow classmates that I was accused with. I would talk with those guys pretty regularly, and so like we would cry and give each other hugs and kind of pep talks while we were going through the process, and really, like my classmates, even before that point, my classmates were some of the biggest support systems, and we would pull together so much, and really help each out.

Furthermore, Paul also advised:

> Find mentors as soon as possible that can really guide you through. Mentors that are in a similar life circumstance as you so that you can rest assured that your strategy will work. I think if you kind of help share that burden with another

> person that's been through, what you're going through already, and can bounce off ideas. You can get their perspective, and the more perspectives you have the better.

Tara shared that “my support system was the most important thing for me through all of it.” She also stressed that “my parents were really helpful.” She further shared:

> I was very blessed that I had my parents to come and help me when I was really stressed out, and I couldn't cook, or clean, or do laundry or anything like that for myself. Very, very lucky that my parents would come and help me with that. My mom would cook food for like a week or two and break it down. I’m an only child. So, having my parents come up just the hour drive and spend time with me, or cook food for me, or do my laundry, because when you're living in a mess it kind of gets to your head a little bit.

Seeking Professional Help. All the interview participants indicated that they sought professional help during their preclinical years after their first or second COMLEX Level 1 failure. Lance shared that he sought professional help to address his learning challenges and explained that being on medication helped him to understand concepts clearer. During a moment of reflection, Lance noted that being on medication sooner may have helped with classes and testing anxiety. Tara shared that therapy was a strategy that she also used to help her balance family, school, and life. She quoted:

> I think therapy was very helpful with that transition, especially right into med school, that transition was really hard. I am very heavily reliant on my support system. So, my friends and family, I’m very, very close with all of them, and they've all helped me a lot.

Professional tutoring programs are also encouraged when medical students fail their board exams the first time, but it is only required after a second failure. As noted in a memo, this participant needed help with testing strategies. Tara explained that she was required to seek assistance through a tutoring program:

> I didn't need help with the material. I mean, maybe some of the material, but it was testing strategies, like how to look at and how to answer the question, how to read it, and how COMLEX is, because COMLEX is not a nice exam. It's very challenging, and they throw a lot of curveballs at you, so, learning how to navigate and read the answer choices, how to eliminate before even reading the question, or just those kinds of strategies. It was a lot more helpful for me the third time around.

Alexandra also sought help from a professional tutoring program. As noted in a memo, cost is an important factor which students must consider when selecting a tutoring service, as they are very expensive. Alexandra explained that she did the Boards Bootcamp program. She shared:

> They basically gave me their own resources and their own books and their own lectures, and you had to follow a set timeline. It was helpful. I guess, having that structured program, instead of just going all over the place with U-World and Amboss questions. It would take you by topic and bring you back to certain things. I guess that helped more.

Paul shared that he sought professional therapy when experiencing marital challenges which affected his academic performance. He stated, "I was in extensive therapy, and it helped out immensely." He also shared his personal experience with

suicidal ideation during this time and he was living in his car. He realized that he needed to take control of his mental health before doing anything he would regret, so he sought out professional help.

Mental Health and Personal Well-Being. Three of the interview participants, Tara, Paul, and Alexandra, shared that at some point during their medical school journey that they learned to prioritize their mental health and their well-being. Tara felt that compromises were normal when in medical school, "so days I wasn't giving it my best, being a little bit more kind to myself, giving myself grace." Alexandra shared "I told myself if I moved out of state to some place by myself. I think my mental health would not have been as good as it was without my family nearby." After failing the COMLEX Level 1 after two attempts, Paul realized:

> I needed to give more attention to my mental health, and I took a medical leave of absence. The two months ended up turning into eight months. Now, I've really developed a lot more, my emotional intelligence and mindfulness. So, I'm much more aware of where I'm at in terms of like burnout level, and how much I'm pushing myself.

It is worthy to note that a medical leave of absence is eight weeks minimum, to allow students to focus on their physical or mental health and seek assistance from a professional. Students are prohibited to study or take any board exams while on a leave of absence.

After seeking professional help, Paul noted:

> Now I know, oh, I'm going to go to the beach, and I'm going to go skimboarding because it's something I really love doing. It gets me active, and it gets me out

> outdoors. Gets me forgetting about anything related to whatever is stressing me at the time. I'm much more aware of myself, and that's what I would do is those different activities that really give me that energy back and let me feel recharged.

The sixth theme, *Navigating Unexpected Challenges,* derived from excerpts from the interview transcripts and the online open-ended questionnaire which highlighted the unexpected challenges students navigated regarding COVID-19.

Navigating Unexpected Challenges

Four of the participants, Vanessa, Lance, Tara, and Paul, pointed out that COVID-19 was a challenge that they had to navigate through during their preclinical years of medical school.

COVID- 19. During the span of this study, COVID-19 was an unexpected stress factor which affected the participants' education during medical school. This was not surprising, as the pandemic affected the entire world. Students had to completely rethink their study strategies during COVID-19 to balance school and family responsibilities. Vanessa mentioned that "COVID definitely was one" challenge that she navigated through during her preclinical years. Lance pointed out that "we had no breaks due to COVID-19, we had four days off, from one semester to the next one." Tara shared "I think Covid was really challenging for me." She further explained:

> When we came back to classes, it was heavily bombarded with osteopathic principles and practice (OPP). We had like 4 OPP Classes in two or three months. What kept me motivated was that eventually I'd be done with my preclinical years. Covid kind of threw a wrench at everything.

Paul pointed out that “Covid was another thing that kind of threw things off because it was at the end of my M2 year that it started.” He elaborated:

> Before that point my family knew that I would stay at school studying, and once I was done studying, I’d get a specific time and say, by six o'clock I would be done. When I would come home, my kids knew that it would be time just for them, and my wife knew that it was time just for her, so I wouldn't study at home then, Covid threw that off, because now I had to study from home, and it was challenging. When Covid hit, I actually wrote an article in the Schools COM Outlook Magazine called *Pandemic Sleep-A father's protocol to studying* or something like that. And basically, because my kids would start interrupting me in the daytime and I really felt from their end that they felt I was rejecting them, and just telling them I don't have time for you. I didn't like them feeling like that, and so I thought about if there was a solution to it. And the solution that I came up with is because I had already done multiple all-nighters. I was like, you know what- what if I just flip my sleep schedule and do a sleep-in version, but like a personal one, and I’ll just study all through the night, and then I’ll go to bed at seven in the morning, sleep in the daytime, and then they'll still get my afternoon time as though I was just studying in the daytime. But then they're not prone to interrupting me, because they know I’m sleeping, and so that worked perfectly. It was so good. I loved it. My body was fine with it. It handled it just fine. It actually got me ready for the clinical years too, because in clinics and in hospitals, sometimes you have to do night calls.

The researcher noted that Paul readjusted his entire schedule and study habits to spend quality time with his family. He sacrificed a lot during his medical journey.

Summary

The findings from this study support both Bandura's theory of self-efficacy and Kelley and Michela's (1980) interpretation of attribution theory. The themes related to self-efficacy theory highlighted by students' thoughts and attitudes, while the themes related to the attribution theory were support from faculty, working with peers, seeking professional help, and taking care of their mental health and personal well-being.

This chapter encapsulated the findings regarding the navigation strategies used by the six interviewed osteopathic medical students and the participants from the online questionnaire who transitioned from their preclinical years of medical school into their clinical years after successfully passing their COMLEX Level 1 board exams. The researcher's aim was centered on the responses from the online questionnaire, and the six individual interviews. These findings are discussed in the subsequent chapter.

Chapter 5: Discussion

Overview of the Research

The purpose of this qualitative case study was to identify the specific strategies used by osteopathic medical students to navigate the academic and personal challenges faced during their preclinical years to persist and successfully transition into the clinical years of the medical program. Fifty-seven students from their third and fourth years of the medical program responded to the online open-ended questionnaire and six of those students who met specific inclusion criteria volunteered to participate in individual semi-structured interviews. The study presents the self-reported experiences and the challenges faced by osteopathic medical students who successfully transitioned into the clinical years of their medical program after passing the COMLEX Level 1 examination. Additionally, the study reveals the strategies used by osteopathic medical students to overcome challenges during their preclinical years to enable medical educators such as faculty, staff, administration, and clinicians to better support them.

Two theoretical frameworks underpin this study; they are: Bandura's (1988) theory of self-efficacy and Kelley and Michela's (1980) interpretation of attribution theory. Bandura's (1988) theory of self-efficacy examined the facets of purposeful management of time, management of stress levels, motivation, and learning strategies students used when experiencing academic challenges (Rudland et al., 2021; Şen, 2016; Bandura, 2010). Moreover, Kelley and Michela's (1980) interpretation of attribution theory examined how motivation influences a learner's well-being, seeking support, and defining goals. The central question for this qualitative case study was as follows: How do students in their preclinical years navigate challenges and

successfully transition into their clinical years, in an osteopathic medical program at a private university in Florida? The four supporting research questions that guided this study were as follows:

1. What are the specific strategies used by this group of students that relate to Bandura's theory of self-efficacy?

2. What are the specific strategies used by this group of students that relate to Kelley and Michela's interpretation of attribution theory?

3. What strategies have the students who passed the COMLEX Level 1 reported to have used to be successful on the first attempt?

4**.** What strategies have students who required more than one attempt to pass the COMLEX Level 1 used to successfully pass the exam?

The researcher conducted an online open-ended questionnaire which yielded 57 responses and conducted six interviews which generated responses through the interview protocol. As a result, twelve themes emerged from the data as the two different data sets were analyzed separately. In addition to these themes which relate directly to self-efficacy and attribution, learning challenges and COVID-19 were challenges which were not found when the researcher was completing the chapter 2 literature review. All interviewed participants who required more than one attempt to pass the COMLEX Level 1 had to first identify why they were experiencing learning challenges and assess through trial and error which strategies worked best for them. All participants from this group sought professional help, whether it was voluntarily or mandated, to attain their goals of successfully passing the COMLEX Level 1.

Relationship of the Findings to the Literature

Research Question 1

The first research question asked, "What are the specific strategies used by this group of students that relate to Bandura's theory of self-efficacy?" This question explored how the participants navigated through the challenges of medical school and the strategies they used which related to Bandura's theory of self-efficacy. The themes: self-efficacy, critical thinking strategies, and self-regulation of learning corresponded to this question. The following discussion is based on the researcher's interpretation of the findings and its connection with the literature. As students navigate through challenges, their thoughts and attitudes influence how they steer themselves through challenges they face. As stated in chapter 2, an individual's beliefs will determine how they feel, think, motivate themselves, and behave in different situations (Bandura,1994).

Theme 1: Self-Efficacy. All online questionnaire participants in this study realized the importance of regulating their thoughts, their behaviors, and their learning to successfully pass their COMLEX Level 1 and transition into their clinical years. In the current study, 56% of the participants who completed the online questionnaire appeared to use components of self-efficacy as they navigated through their preclinical years by purposely managing their time and determining the learning strategies which work best for them. This connects with the Zheng et al. (2021) study which examined how self-efficacy impacted academic motivation and self-regulated learning. Additionally, the authors explored these factors that contribute to a medical student's academic performance (Zheng et al., 2021). The study found that students with high efficacy had a

direct impact in their learning outcomes. The authors stressed the importance of promoting students' self-efficacy in undergraduate medical environments (Zheng et al., 2021).

Theme 2: Critical Thinking Strategies. In addition to self-efficacy, participants pointed out that attaining critical thinking strategies was important in preparing, studying, and applying what they have learned to assist them when facing challenges. In the current study, 70% of the participants who completed the online questionnaire pointed out that this strategy helped them to know how to process information and how to make decisions regarding their studies, prepared for exams, and how they utilized the information learned in the real world. This supports the findings in previous literature which found that self-regulated learning enhances academic performance by utilizing strategies such as elaboration and critical thinking (Ballouk et al., 2021).

Theme 3: Self-Regulation of Learning. In the current study, 88% of the online questionnaire participants attributed their academic performance to regulating their behaviors, pursuing a goal, planning how to pursue and implanting strategies to help attain those goals. Some examples include attending study tables for review, controlling their learning at their own pace, taking necessary breaks when needed, and utilizing additional outside resources to supplement their learning. The results of this study were similar to another study, which explored how medical students altered their learning styles and behaviors in a blended learning environment to become independent and self-regulated learners (Ballouk et al., 2021). They found that self-regulated learning enhanced academic performance, improved study habits through resource selection and drove student motivation and autonomy (Ballouk et al., 2021).

Research Question 2

The second research question asked, "What are the specific strategies used by this group of students that relate to Kelley and Michela's interpretation of attribution theory?" This question explored how the participants described their support, feedback, and goals which related to Kelley and Michela's interpretation of attribution theory. The themes of feedback seeking, and internal goal orientation related to this question. How and when students seek help will influence the type of support they attain, which in turn will define their goals.

Theme 4: Feedback Seeking. In the current study, 35 of 57 online questionnaire participants shared that they sought help from their peers, faculty, or professionals throughout their preclinical years which helped them navigate academic and personal challenges they faced. The online questionnaire participants found that learning in groups, attending peer guided study reviews, or talking things through with a peer for clarification was helpful. This connects with a study where Ballouk et al. (2021) found that when feedback and guidance was provided to students while they were regulating their learning, their motivation increased. The researchers stressed that feedback from medical staff allows the medical students to reflect and adjust their learning strategies in an intentional manner to attain their goals (Ballouk et al., 2021).

Theme 5: Internal Goal Orientation. 54% of the online questionnaire participants recognized that setting daily or weekly goals contributed to them staying motivated to persist in their program. This connects with a study conducted by Inzlicht et al. (2021) where they stated that self-regulation is an underlying aspect which helps to facilitate all personal goals.

As self-regulation allows individuals to choose goal-relevant activities, deciding to pursue those goals, planning how to pursue said goal, implementing these goals, protecting the goals from apprehensions, and knowing when to abandon them (Inzlicht et al., 2021).

Research Question 3

The third research question asked, "What strategies have the students who passed the COMLEX Level 1 reported to have used to be successful on the first attempt?" This question explored how the participants navigated through the challenges they faced and the strategies they utilized to successfully pass their COMLEX Level 1 on their first attempt. The themes of (a) learning strategies, (b) self-regulation of learning, (c) purposeful management of time, and (d) work-life-balance.

Theme 6: Learning Strategies. In the current study, Vanessa and Maria shared that they had to use specific strategies to navigate the medical school journey during their preclinical years to pass their COMLEX Level 1 and transition into their clinical years. Having specific learning strategies, self-regulation of learning, purposeful management of their time, and work-life-balance were key factors and skills which attributed to their passing their COMLEX Level 1 on their first attempt. Similarly, the group of participants who completed the online questionnaire and who only required one attempt to the COMLEX Level 1, Vanessa and Maria understood the importance of first understanding how they learned best, what worked for them, and having the self-awareness to reassess their learning strategies as needed. Vanessa shared that due to her the gap year between college and medical school, she "forgot how to study." Both participants used visual aids tools such as sketchy, space

repetition tools such as ANKI, and watched YouTube videos to assist in their learning. This connected to a study that focused on the learning tools which were effective for medical students during the COVID-19 era. It found that new digital formats dealing with active learning strategies such as visual learning tools and microlearning have been increasingly utilized to increase retention of information (Chen et al. 2022). Prior to social distancing, eLearning offered the advantage of convenience, customization, and cost-efficiency over the traditional classroom methods (Chen et al. 2022).

Theme 7: Self-Regulation of Learning. Participants in this study who completed the online questionnaire shared that they preferred to watch the lectures online, as it allowed them to pause at any time, take necessary breaks, and determine which learning tools and strategies work best for them. This connects with a recent study conducted by Trullas et al. (2022) which explored the effectiveness of problem-based learning as a pedagogical approach and requires medical students to shift to self-directed learning. They found that problem-based learning was more effective than traditional lecture-based methods as it improved student social and communication skills, problem-solving, and self-learning skills (Trullas et al., 2022).

Theme 8: Purposeful Management of Time. In this current study, Maria shared that "time management was an area in which she struggled the most in. After seeking help from her academic advisor, Maria created a "time management schedule." This connects with the Malau-Aduli et al. (2020) study which explored the perceptions and processes which influenced the transition of medical students from their preclinical years to their clinical training years. They found that there is significant evidence which has indicated that some medical students experience

academic difficulties due to poor time management (Malau-Aduli et al., 2020). Students who struggled with time management and inadequate study time also experienced issues during their clinical training years (Malau-Aduli et al., 2020). The authors believed that attaining time management skills is vital to performing well during their programs. Additionally, they found that as students progressed through the medical program, they were able to accept that the transition from preclinical to clinical was a gradual process and they needed to allow for an essential learning curve (Malau-Aduli et al., 2020).

Theme 9: Work-Life-Balance. Except for Lance, the interviewed participants in this study expressed a significant challenge with balancing their academics and familial obligations, especially when they were also dealing with having to isolate during the COVID pandemic. They felt overwhelmed and stressed at having to attend to the responsibilities at home and at school. Vanessa shared the need to spend time with her family and do other things she enjoyed, like coaching the girls' wrestling team. Paul was married with three children, and prior to COVID-19 he studied at school, however, during COVID-19, he had to change his strategy to schedule dedicated time to spend with his children, his wife, and his academics. Maria explained that she set dedicated time aside to complete her familial responsibilities, however, if she did not have time, she was sure to vocalize it. Lance, Tara, and Alexandra shared that they depended heavily on their parents to support them at home, which reduced a lot of the stress of doing chores which allowed them to dedicate most of their time to studying. This links with a study which indicated that work-life-balance is a key contributor to a medical student's well-being

(Picton, 2021). When students receive support from family and friends, they were able to cope with lifelong learning and deliver patient care effectively (Picton, 2021).

Research Question 4

The fourth research question asked, "What strategies have students who required more than one attempt to pass the COMLEX Level 1 used to successfully pass the exam?" This question explored how the participants described the challenges they faced after being unsuccessful on their COMLEX Level 1 and requiring more than one attempt. Seven subthemes corresponded to the three themes*:* (a) understanding your needs, (b) seeking help at the right time, and (c) navigating unexpected challenges. The Seven subthemes emerged from the data which connect the four participants' navigation of challenges: (a) learning challenges, (b) thoughts and attitudes, (c) support from faculty, (d) support from peers, (e) seeking professional help, (f) mental health and well-being, and (g) COVID-19.

Theme 10: Understanding Your Needs. During the analysis, student attitude was found to be an important element needed to be successful in medical school and to successfully transition. Their beliefs and attitudes towards their academic abilities are critical factors which determine a student's academic performance (Hayat et al., 2020). Correspondingly, this relates to self-regulation and determines how long a medical student will persist when faced with challenges.

Learning Challenges. All interview participants faced challenges recognizing the learning techniques which worked for them as well as the strategies they utilized to prevail over their challenges. Some examples include how to study, needing more time to learn and process new information, overcoming testing anxiety, and learning testing

strategies. This connects with the Cipra et al. (2019) study which investigated the correlation between anxiety and learning approaches as it relates to the development of exams. They found that there was a correlation between a surface learning approach and high levels of anxiety. Medical students who utilized a strategic approach to learning were less anxious and more successful (Cipra et al., 2019). Due to the risk of academic failure related to anxiety and burnout, medical faculties are to place an emphasis on demonstrating strategies on coping with stress and successful learning (Cipra et al., 2019).

Thoughts and Attitudes. A critical aspect of self-efficacy, resiliency, self-regulation, a medical students' thoughts and attitude are key to pursuing and attaining desired goals. All interview participants realized the importance of positive thinking and positive attitudes as they faced challenges. This relates to the study which investigated the relationship between academic self-efficacy, metacognitive learning strategies, and learning related emotions, and how it affects academic performance in medical students (Hayat et al., 2020). They shared that "emotions have complex association with cognitive, motivational, and behavioral processes, especially in the classroom and educational settings, in all educational situations, and in clinical settings, as experienced by the students" (Hayat et al., 2020, p.2). They found that the students' self-efficacy impacts their learning-related emotions and metacognitive learning strategies, which then affects a students' academic performance. Self-efficacy beliefs are correlated to the student's academic performance which determine commitment, endeavor, and perseverance (Hayat et al., 2020).

Theme 11: Help at the Right Time. In the current study, all interview participants sought support from their peers, faculty, or mental health professionals when navigating challenges. All interviewed participants, except for Vanessa, sought help from their faculty or academic advisors. However, all, except Lance, found their guidance and support helpful.

Support From Faculty. The interview participants described the various support they sought from their medical faculty as they navigated challenges academically and personally. Some examples include seeking support after failing the COMLEX Level 1 with study strategies, help with creating study schedules, organization skills, guidance, and encouragement. Medical school administrators, advisors, and staff are an underutilized resource by students. Most students only seek support from medical faculty once they are mandated to do so. In a study that focused on the strategies of medical students, they found the new generation of medical students are reluctant to seek help from faculty, while other students found them unapproachable (Malau-Aduli et al., 2020). One participant who completed the online questionnaire shared "medical school staff was unavailable and unapproachable during board preparation". However, adequate support from faculty is needed when students face academic difficulty and the need to create an inviting academic environment (Malau-Aduli et al., 2020).

Support from Peers. In the current study, all interview participants shared that they sought support from their peers in some way or another, whether it was for studying, encouragement, or for bonding. Tara stressed that "relying on upper classmen was helpful. I'm really glad I was part of the peer mentor program." Paul shared how he leaned on his classmates for support when he was navigating academic

and personal challenges. This connects with a study which explored the effectiveness of peer support programs for medical students during times of distress and how they viewed their support from their peers (Graves et al., 2022). They concluded that students valued peer support when the programs were informal (Graves et al., 2022). However, peer support leaders should be trained in strategic methods for promoting informal peer support. Additionally, Graves et al. (2022) noted that peer support may facilitate early help-seeking behaviors which may lead medical students to seek professional advice. This also connects with the study conducted by Malau-Aduli et al. (2020) which discovered that students were able to navigate through their challenges by seeking support from peers and upper-class peers to cope with stress and anxiety. Another study which investigated the efficacy of peer assisted learning within medical education found that academic performance of medical students improved significantly when they received peer assisted learning compared to those who did not (Brierley et al., 2022).

Seeking Professional Help. All participants described the various help which they sought outside of the medical school. Lance sought help from a psychiatrist for his learning challenges, while Paul sought help from a mental health professional for his suicidal ideation and marital challenges. Both Tara and Alexandra sought professional tutoring from Northwestern tutoring and COMLEX Bootcamp program, respectively. This is consistent with recent literature in which medical students pursued support to overcome challenges (Chandratre, 2020). This study explored the supportive strategies used by medical students during the COVID-19 pandemic. Depression, suicidal ideation, and stigma around depression has increased within

medical students, however, they are less likely to seek support due to the stigma around depression (Chandratre, 2020). They stress the importance of safeguarding medical students' mental health with effective plans to support their wellness and their education (Chandratre, 2020).

Mental Health and Well-Being. Prioritizing their mental health and well-being at some point during their preclinical years of medical school was articulated by all interviewed participants as they faced and navigated through challenges. This relates to the literature, where Ayala et al. (2018) study surveyed the relationship between self-care and stress affected a medical student's mental and physical quality of life. They found that when medical students increased their engagement in self-care activities, their perceived stress decreased (Ayala et al., 2018). Additionally, medical students who practiced of self-care regularly by using multiple forms, which included nutrition, interpersonal relationships, health responsibility, physical activity, spiritual growth, and stress management, throughout their medical school training may sustain greater resiliency and a lower risk for high levels of distress during their medical education (Ayala et al., 2018).

Theme 12: Navigating Unexpected Challenges. All participants in this study voiced that COVID-19 impacted their lives, how they studied, and how they interacted with their families, and peers. The COVID pandemic affected the entire world and was not a factor previously researched as this occurred in the spring of 2020. This was a completely unknown and unexpected challenge which medical students had to navigate, along with all the other previously known challenges.

COVID-19. All participants had to rethink their strategies on how to prepare for their exams when the world shut down due to the pandemic, when all lectures and exams moved to online. learning study conducted by Andersen et al. (2022), they explored the impact the COVID-19 pandemic had on medical students as they were forced to transition from in-person learning to online learning. Students faced learning difficulties, social isolation, limited student and faculty relationships, and their academic performance declined (Andersen et al., 2022). The results indicated that during the pandemic students felt isolated due to studying at home more than previous cohorts, their mental health was affected, and relationships were faculty and peers were impacted (Andersen et al., 2022). In another study, osteopathic medical students were to quickly adjust to online learning as it impacted clinical learning (Slivkoff et al. 2021). They learned that the unexpected challenges medical students faced during the COVID-19 pandemic required that students adjust their learning behaviors, had limited access to their preferred learning spaces, revise their daily schedules and routine, need accountability and self-regulation, attain new learning methods and resources, reconsider familial responsibilities, and increased anxiety due to personal and academic uncertainty (Slivkoff et al. 2021). They reported the osteopathic medical students used the following strategies in response to COVID-19: connected with family, increased in physical activities, spending time outside, increased sleep, studied less, and continued with any previous meditation or mindfulness practices (Slivkoff et al. 2021).

Limitations of the Study

All studies have limitations, due to the nature of this qualitative research, an in-depth study of a specific situation, this this study is no exception. Similar studies would need to be conducted at other medical institutions and with allopathic students to determine if the results may be generalized. Due to the distance between all students completing their clinical rotations in different hospital locations, all interviews occurred through Zoom. The researcher experienced technology and internet issues while using Zoom, this may have caused transcription to be lost during moments when connection was lost or frozen. Of the 57 participants who responded to the online questionnaire, 51 were students who passed on their first attempts. This resulted in the researcher getting the overwhelming perspective of the students who passed on their first attempt rather than those who required two or three attempts to pass their exam. They were more inclined to volunteer for the follow-up individual interview. Of the seven who required more than one attempt, five shared their contact information to schedule a follow up interview, but only four responded and were scheduled to be interviewed.

Recommendations for Incoming Medical Students

Develop Essential Self-Regulation Skills and Positive Attitudes

According to the findings in this study, new medical students should focus on increasing self-efficacy, strategies to self-regulate their learning, study strategies, testing strategies, and the purposeful management of their time. These skills and strategies are crucial to the success of transitioning to clinicals. They must realize the importance that the earlier they attain these necessary skills, the greater chance they

have of performing well in both their preclinical courses and passing the COMLEX Level 1 on their first attempt.

Seek Supportive Relationships

The findings of this study indicate that new osteopathic medical students face various challenges as they progress through their preclinical years and transition into their clinical years. Challenges include learning strategies, regulation of learning, time management, prioritizing wellbeing, and dealing with balancing academic and familial responsibilities. Based on the findings, it is recommended that new medical students seek supportive relationships. Peer support and mentorship are the best form of support a new osteopathic medical student should pursue early on in their medical journey. Peer mentors can share experiences of what worked for them relating to learning strategies, skills learned, and study habits. Faculty mentors can provide guidance to steer students in the right direction, help create study schedules, organization skills, and encouragement. In addition to peer and faculty support, seeking professional help at the right time is instrumental to a student's success in medical school.

Recommendations for Medical School Administrators

Develop Essential Programs

New medical students should be provided with an academic success course in the beginning of each semester or each year which provides students with specific skills, study strategies, and testing strategies for both preclinical courses and for COMLEX Level 1 preparation. Offering their courses prior to the commencement of their preclinical sciences courses would aid students in understanding how to study and successfully prepare for learning large amounts of information. Additionally, the

academic success course would remind students who have taken gap years after earning their undergraduate how to study for long periods of time. This course would also provide them with the organizational, time management, and testing strategies needed to successfully pass a medical state licensing board exam, such as the COMLEX.

Provide Positive Faculty Support Systems

Faculty should create a more welcoming and inviting, open-door environment where students feel safe to reach out for support, guidance, and mentorship. First year medical students should be paired with a clinical faculty mentor who will meet with them regularly throughout their four years in the program to guide them as they navigate challenges. Fostering a positive mentoring relationship with the students would allow faculty to identify any skills or learning gaps, model behaviors and self-efficacy beliefs, and self-regulation skills needed to be successful in medical school.

Recommendations for Future Research

The findings in this research study are useful because of the lack of research related to the strategies used by osteopathic medical students to navigate through challenges faced during preclinical years to transition successfully into their clinical years. Further research in this area is essential to better understand how to support medical students, given the changed nature of medical education after COVID-19. Specifically, examining participants who did not successfully transition into their clinical years could provide valuable insight and data. Additionally, examining participants who also have learning disabilities or psychological disabilities, making

medical school more challenging may provide valuable data for medical administrators.

The world went through the COVID-19 pandemic, this was a completely unexpected challenge for all students, which required them to seek support from friends, family as they were unprepared to deal with the isolation, the drastic shift to online learning, and the limited support they received from the medical faculty. Participants who completed the online questionnaire and the interview stressed that there was a lack of communication between the student and the administration was concerning during the COVID-19 pandemic. Some faculty transitioned to online office hours, while others were unreachable. Again, the pandemic affected everyone, it was a transition which not only medical students had to navigate through, but so did the faculty and administration.

Subsequently, the researcher found that those who required more than one attempt to pass the COMLEX Level 1, not only faced academic difficulties, but they also dealt with additional stressors, such as unexpected death in the family, parental illness, lack of support, marital issues, and behavioral issues which intensified their situation. The researcher noted that when students were faced with compounded issues during their medical journey, that lead to increased mental and emotional stress, which in turn significantly influenced their academic performance. All interview participants who required more than one attempt to pass the COMLEX Level 1 experienced compounded issues during their preclinical years. Not only did those participants face several challenges during their preclinical years, but they also all navigated through COVID-19 pandemic. Which was very challenging for all. Students who only had to

navigate through the pandemic without any additional stressors in their lives were more successful academically.

References

Ahmady, S., Khajeali, N., Sharifi, F., & Mirmoghtadaei, Z. S. (2019). Factors related to academic failure in preclinical medical education: A systematic review. *Journal of advances in medical education & professionalism*, *7*(2), 74–85. https://doi.org/10.30476/JAMP.2019.44711

Alicke, M. D., & Sedikides, C. (2009). Self-enhancement and self-protection: What they are and what they do. *European Review of Social Psychology*, *20*(1), 1-48.

American College Health Association. (2018). American College Health Association-National College Health Assessment II: Reference Group Executive Summary Fall 2018. Silver Spring, MD: American College Health Association.

Andersen, S., Leon, G., Patel, D., Lee, C., & Simanton, E. (2022). The impact of COVID-19 on academic performance and personal experience among first-year medical students. *Medical Science Educator*, *32*(2), 389-397.

Association of American Medical Colleges (AAMC). Retrieved from https://students-residents.aamc.org/choosing-medical-career/what-expect-medical-school.

Ayala, E. E., Winseman, J. S., Johnsen, R. D., & Mason, H. R. C. (2018). U.S. medical students who engage in self-care report less stress and higher quality of life. *BMC Medical Education, 18*. https://doi.org/10.1186/s12909-018-1296-x

Bair, C. R., & Haworth, J. G. (2004). Doctoral student attrition and persistence: A meta-synthesis of research. In *Higher education: Handbook of theory and research* (pp. 481-534). Springer, Dordrecht.

Ballouk, R., Mansour, V., Dalziel, B., McDonald, J., & Hegazi, I. (2022). Medical students' self-regulation of learning in a blended learning environment: a systematic scoping review. *Medical Education Online*, *27*(1), 2029336.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191–215. https://doi.org/10.1037/0033-295X.84.2.191

Bandura, A. (1988). Self-efficacy conception of anxiety. *Anxiety research*, *1*(2), 77-98.

Bandura, A. (1989). Regulation of cognitive processes through perceived self-efficacy. *Developmental Psychology, 25*(5), 729-735. https://doi.org/10.1037/0012-1649.25.5.729

Bandura, A., & Wessels, S. (1994). *Self-efficacy* (Vol. 4, pp. 71-81). na.

Bandura, A. (2010). Perceived Self-Efficacy in Cognitive Development and Functioning, Educational Psychologist, 28:2, 117-148. http://doi.org/10.1207/s15326985ep2802_3

Bardwell, R. (1986). Attribution theory and behavior change: Ideas for nursing settings. *Journal of Nursing Education*, *25*(3), 122-124.

Bellucci, N. A. (2016). A qualitative investigation of strategies used by PhD nursing students for balancing work, family, and the attainment of a PhD. Retrieved from https://ezproxylocal.library.nova.edu/login?url=https://www-proquest-com.ezproxylocal.library.nova.edu/dissertations-theses/qualitative-investigation-strategies-used-phd/docview/1845002391/se-2?accountid=6579.

Bickerdike, A., O'Deasmhunaigh, C., O'Flynn, S., & O'Tuathaigh, C. (2016). Learning strategies, study habits and social networking activity of undergraduate medical students. *International journal of medical education*, *7*, 230.

Bloomberg, L., & Volpe, M. (2016). Completing your qualitative dissertation: A road map from beginning to end. (3rd ed). Sage Publications. Los Angeles, CA.

Blum, N., Berlin, A., Isaacs, A., Burch, W. J., & Willott, C. (2019). Medical students as global citizens: a qualitative study of medical students' views on global health teaching within the undergraduate medical curriculum. *BMC medical education*, *19*(1), 1-9.

Boone, S. C., De Charon, L., Hill, M. M., Preiss, A., Ritter-Williams, D., & Young, E. (2020). Doctoral student persistence and progression: a program assessment. *Journal of Applied Research in Higher Education*, *12*(4), 753-765. https://doi.org/10.1108/JARHE-07-2019-0192

Braun, V., Clarke, V., Boulton, E., Davey, L., & McEvoy, C. (2021). The online survey as a qualitative research tool. *International Journal of Social Research Methodology*, *24*(6), 641-654.

Brazeau, C. M., Shanafelt, T. D., Durning, S. J., Massie, F. S., Eacker, A., Moutier, C., …Dyrbye, L. N. (2014). Distress among matriculating medical students relative to the general population. *Academic Medicine. 89*(11), 1520–1525. https://doi.org/0.1097/ACM.0000000000000482

Brierley, C., Ellis, L., & Reid, E. R. (2022). Peer-assisted learning in medical education: A systematic review and meta-analysis. *Medical Education*, *56*(4), 365-373.

Brokaw, J. J., Byram, J. N., Traser, C. J., & Arbor, T. C. (2016). How the distinctive cultures of osteopathic and allopathic medical schools affect the careers, perceptions, and institutional efforts of their anatomy faculties: A qualitative case study of two schools. *Anatomical Sciences Education, 9*(3), 255-264. https://doi.org/10.1002/ase.1582

Byrnes, C., Ganapathy, V. A., Lam, M., Mogensen, L., & Hu, W. (2020). Medical student perceptions of curricular influences on their wellbeing: a qualitative study. *BMC medical education*, *20*(1), 1-11.

Carter, S. D. (2015). *Emotional intelligence: A qualitative study of the development of emotional intelligence of community college students enrolled in a leadership development program.* Retrieved from https://ezproxylocal.library.nova.edu/login?url=https://www-proquest-com.ezproxylocal.library.nova.edu/dissertations-theses/emotional-intelligence-qualitative-study/docview/1717099457/se-2?accountid=6579.

Chandratre, S. (2020). Medical students and COVID-19: challenges and supportive strategies. *Journal of medical education and curricular development*, *7*, 2382120520935059.

Chen, D., Ayoob, A., Desser, T. S., & Khurana, A. (2022). Review of learning tools for effective radiology education during the COVID-19 era. *Academic Radiology*, *29*(1), 129-136.

Cipra, C., & Müller-Hilke, B. (2019). Testing anxiety in undergraduate medical students and its correlation with different learning approaches. *PloS one*, *14*(3), e0210130.

Creswell, J. W. & Poth, C. N. (2016). *Qualitative inquiry & research design, Choosing among five approaches* (4th ed.). Sage Publications.

Creswell, J. W. & Guetterman, T. C. (2019). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (6th ed.). Upper Saddle River, NJ: Pearson.

Davies, T. A., Miller, M. B., Moore, V. A., & Kaye, E. A. (2020). Predicting professional school performance with a unique lens: Are there other cognitive predictors? *BMC Medical Education, 20*, 1-10. https://doi.org/10.1186/s12909-020-1930-2

Demetriou, C. (2011). The attribution theory of learning and advising students on academic probation. *NACADA Journal, 31*(2), 16-21.

Devos, C., Boudrenghien, G., Van der Linden, N., Azzi, A., Frenay, M., Galand, B., & Klein, O. (2017). Doctoral students' experiences leading to completion or attrition: A matter of sense, progress and distress. *European Journal of Psychology of Education, 32*(1), 61-77. https://doi.org/10.1007/s10212-016-0290-0

Diefenbach, T. (2009). Are case studies more than sophisticated storytelling?: Methodological problems of qualitative empirical research mainly based on semi-structured interviews. *Quality and Quantity, 43*(6), 875-894. https://doi.org/10.1007/s11135-008-9164-0

Diem, C., & Hairrell, A. (2019). Charting a successful course: The academic and clinical success committee's impact on student success. *Education for Health, 32*(2), 84-86. https://doi.org /10.4103/efh.EfH_244_17

Dong, Y., Stupnisky, R. H., & Berry, J. C. (2013). Multiple causal attributions: An investigation of college students learning a foreign language. *European Journal of* https://doi.org/10.1007/s10212-013-0183-4

Dyrbye, L.N., Sciolla, A. F., Dekhtyar, M., Rajasekaran, S., Allgood, J., Aaron D.O, Rea, M., Knight, A. P., Haywood, A., Smith, S., Stephens, M. B., M. (2019). Medical School Strategies to Address Student Well-Being: A National Survey, Academic Medicine: June 2019 - Volume 94 - Issue 6 - p 861-868. https://doi.org/10.1097/ACM.0000000000002611

Dyrbye, L.N., West, C.P., Satele, D., Boone, S., Tan., L., Sloan, J., Shanafelt ,T.D. (2014). Burnout among U.S. medical students, residents, and early career physicians relative to the general U.S. population. Acad Med. 89(3):443-51. https://doi.org/10.1097/ACM.0000000000000134.PMID: 24448053

Frosch, E., & Goldstein, M. (2019). Relationship-centered advising in a medical school learning community. *Journal of Medical Education and Curricular Development, 6.* https://dx.doi.org /10.1177/2382120519827895

Gaier, S. E. (2015). Understanding why students do what they do: Using attribution theory to help students succeed academically. *Research and Teaching in Developmental Education*, 6-19.

Gill, P., Stewart, K., Treasure, E., & Chadwick, B. (2008). Methods of data collection in qualitative research: interviews and focus groups. *British dental journal*, *204*(6), 291-295.

Goodman, A. (2012). Work–life balance. In *Physicians' pathways to non-traditional careers and leadership opportunities* (pp. 25-34). Springer, New York, NY.

Graves, J., Flynn, E., Woodward-Kron, R., & Hu, W. C. (2022). Supporting medical students to support peers: a qualitative interview study. *BMC Medical Education*, *22*(1), 1-8.

Greenhill, J., Fielke, K. R., Richards, J. N., Walker, L. J., & Walters, L. K. (2015). Towards an understanding of medical student resilience in longitudinal integrated clerkships. *BMC Medical Education, 15* Retrieved from https://ezproxylocal.library.nova.edu/login?url=https://www.proquest.com/scholarly-journals/towards-understanding-medical-student-resilience/docview/1780257396/se-2.

Guerrasio, J., Garrity, M. J., & Aagaard, E. M. (2014). Learner deficits and academic outcomes of medical students, residents, fellows, and attending physicians referred to a remediation program, 2006–2012. *Academic Medicine*, *89*(2), 352-358.

Harvey, P., & Martinko, M. J. (2009). Attribution theory and motivation. *Organizational behavior, theory and design in health care*, 143-158.

Hayat, A.A., Shateri, K., Amini, M. (2020). Relationships between academic self-efficacy, learning-related emotions, and metacognitive learning strategies with

academic performance in medical students: a structural equation model. *BMC Med Educ* 20, 76. https://doi.org/10.1186/s12909-020-01995-9

Heinen, I., Bullinger, M., & Kocalevent, R. D. (2017). Perceived stress in first year medical students-associations with personal resources and emotional distress. *BMC medical education*, *17*(1), 1-14.

Hill, M. R., Goicochea, S., & Merlo, L. J. (2018). In their own words: stressors facing medical students in the millennial generation. *Medical education online*, *23*(1), 1530558.

Horsburgh, J., & Ippolito, K. (2018). A skill to be worked at: Using social learning theory to explore the process of learning from role models in clinical settings. *BMC Medical Education, 18.* https://doi.org/10.1186/s12909-018-1251-x

Inzlicht, M., Werner, K. M., Briskin, J. L., & Roberts, B. W. (2021). Integrating models of self-regulation. *Annual Review of Psychology*, *72*, 319-345.

Jumat, M. R., Pierce Kah-Hoe Chow, Allen, John Carson, Jr, Siang, H. L., Hwang, N., Iqbal, J., . . . Compton, S. (2020). Grit protects medical students from burnout: A longitudinal study. *BMC Medical Education, 20*, 1-9. https://doi.org/10.1186/s12909-020-02187-1

Kalu, M. E. (2019). Using emphasis-purposeful sampling-phenomenon of Interest–Context (EPPiC) framework to reflect on two qualitative research designs and questions: A reflective process. *The Qualitative Report, 24*(10), 2524-2535.

Kawamoto, R., Ninomiya, D., Kasai, Y., Kusunoki, T., Ohtsuka, N., Kumagi, T., & Abe, M. (2016). Gender difference in preference of specialty as a career choice among Japanese medical students. *BMC medical education*, *16*(1), 1-8.

Keeton, K., Fenner, D. E., Johnson, T. R., & Hayward, R. A. (2007). Predictors of physician career satisfaction, work–life balance, and burnout. *Obstetrics & Gynecology*, *109*(4), 949-955.

Kelley, H. H., & Michela, J. L. (1980). Attribution theory and research. *Annual review of psychology*, *31*(1), 457-501.

Kemp, S., Hu, W., Bishop, J., Forrest, K., Hudson, J. N., Wilson, I., . . . Wearn, A. (2019). Medical student wellbeing – a consensus statement from Australia and New Zealand. *BMC Medical Education, 19*. https://dx.doi.org/10.1186/s12909-019-1505-2

Khan, T. (2020). *Bridging mindset theory and attribution theory: A longitudinal exploration of students' belief patterns in their early years of college.* Available from APA PsycInfo®. Retrieved from https://ezproxylocal.library.nova.edu/login?url=https://www.proquest.com/dissertations-theses/bridging-mindset-theory-attribution-longitudinal/docview/2407355180/se-2?accountid=6579.

Klassen, R. M., & Klassen, J. R. (2018). Self-efficacy beliefs of medical students: a critical review. *Perspectives on medical education*, *7*(2), 76-82.

Krisberg, K. (2016). Medical school burnout. Wellness. *AAMC News*. Retrieved from https://www.aamc.org/news-insights/medical-school-burnout.

Kvale, S., & Brinkmann, S. (2009). *Interviews: Learning the craft of qualitative research interviewing*. sage.

Lampe, L. C., & Müller-Hilke, B. (2021). Mindfulness-based intervention helps preclinical medical students to contain stress, maintain mindfulness and improve

academic success. *BMC Medical Education, 21*, 1-8. https://doi.org/10.1186/s12909-021-02578-y

Leavy, P. (2014). *The oxford handbook of qualitative research*. Oxford University Press, Incorporated.

Lee, S., Park, C., Kim, B., Lee, C., Cha, B., Lee, Y., . . . Choi, J. (2020). Psychological development during medical school clerkship: Relationship to resilience. *Academic Psychiatry: The Journal of the American Association of Directors of Psychiatric Residency Training and the Association for Academic Psychiatry, 44*(4), 418-422. https://doi.org/10.1007/s40596-020-01191-3

Locke, L. F., Silverman, S. J., & Spirduso, W. W. (2010). *Reading and understanding research* (3rd ed.). Thousand Oaks, CA: Sage.

Malau-Aduli, B., Roche, P., Adu, M., Jones, K., Alele, F., & Drovandi, A. (2020). Perceptions and processes influencing the transition of medical students from preclinical to clinical training. *BMC Medical Education, 20*, 1-13. https://doi.org/10.1186/s12909-020-02186

Martinez, E., Ordu, C., Della Sala, M. R., & McFarlane, A. (2013). Striving to obtain a school-work-life balance: The full-time doctoral student. *International Journal of Doctoral Studies*, *8*(39-59), 039-059.

Mata, D. A., Ramos, M. A., Kim, M. M., Guille, C., & Sen, S. (2016). In Their Own Words: An Analysis of the Experiences of Medical Interns Participating in a Prospective Cohort Study of Depression, Academic Medicine: *91(9),* 1244-1250. https://doi.org/10.1097/ACM.0000000000001227

McClain, E. K. (2009). *The relationship of emotional intelligence to academic performance and perceived stress in first year medical students*. Retrieved from https://ezproxylocal.library.nova.edu/login?url=https://www.proquest.com/dissertations-theses/relationship-emotional-intelligence-academic/docview/304911743/se-2?accountid=6579.

McHugh, D., Yanik, A. J., & Mancini, M. R. (2021). An innovative pharmacology curriculum for medical students: Promoting higher order cognition, learner-centered coaching, and constructive feedback through a social pedagogy framework. *BMC Medical Education, 21*, 1-18. https://doi.org/10.1186/s12909-021-02516-y

Merriam, S. (2009). *Qualitative research: A guide to design and implementation*. Hoboken, NJ: Wiley.

Miller-Matero, L., Martinez, S., MacLean, L., Yaremchuk, K., & Ko, A. (2018). Grit: A predictor of medical student performance. *Education for Health, 31*(2), 109-113. https://doi.org/10.4103/efh.EfH_152_16

Nabizadeh, S., Hajian, S., Sheikhan, Z., & Rafiei, F. (2019). Prediction of academic achievement based on learning strategies and outcome expectations among medical students. *BMC Medical Education, 19.* https://doi.org/10.1186/s12909-019-1527-9

National Board of Osteopathic Medical Examiners. (2023). Retrieved from https://www.nbome.org/assessments/comlex-usa/comlex-usa-level-2-pe/.

National Board of Osteopathic Medical Examiners. (2021). Retrieved from https://www.nbome.org/assessments/comlex-usa/comlex-usa-level-3/comlex-usa-level-3-performance-data/.

National Board of Osteopathic Medical Examiners News. (2019). Osteopathic medicine 127 years later: Through the eyes of A.T. Still, MD. Retrieved from https://www.nbome.org/news/osteopathic-medicine-127-years-later/.

Ngwira, F. F., Gu, C., Mapoma, H. W. T., & Kondowe, W. (2017). The role of academic emotions on medical and allied health students??? motivated self-regulated learning strategies. *Journal of Contemporary Medical Education*, *5*(1), 23-30.

Orom, H., Semalulu, T., & Underwood III, W. (2013). The social and learning environments experienced by underrepresented minority medical students: A narrative review. *Academic Medicine*, *88*(11), 1765–1777. Retrieved from: http://journals.lww.com/academicmedicine/Fulltext/2013/11000/The_Social_and_Learning_Environments_Experienced.48.aspx.

Patterson, J. (2017). *Identifying as husbands, fathers, and school leaders: A phenomenology of doctoral persistence among limited residency students*. Liberty University.

Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educational psychology review*, *18*(4), 315-341.

Pekrun, R., Elliot, A. J., & Maier, M. A. (2009). Achievement goals and achievement emotions: Testing a model of their joint relations with academic performance. *Journal of Educational Psychology, 101*(1), 115. Retrieved from

https://ezproxylocal.library.nova.edu/login?url=https://www.proquest.com/scholarly-journals/achievement-goals-emotions-testing-model their/docview/210972250/se-2?accountid=6579.

Perotta, B., Arantes-Costa, F., Enns, S. C., Figueiro-Filho, E., Paro, H., Santos, I. S., . . Tempski, P. Z. (2021). Sleepiness, sleep deprivation, quality of life, mental symptoms and perception of academic environment in medical students. *BMC Medical Education, 21*, 1-13. https://doi.org/10.1186/s12909-021-02544-8

Phillippi, J., & Lauderdale, J. (2018). A guide to field notes for qualitative research: Context and conversation. *Qualitative health research*, *28*(3), 381-388.

Picton, A. (2021). Work-life balance in medical students: Self-care in a culture of self-sacrifice. *BMC Medical Education, 21*, 1-12. https://doi.org/10.1186/s12909-020-02434-5

Pintrich, P. R., & de Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology, 82*(1), 33–40. https://doi.org/10.1037/0022-0663.82.1.33

Prayson, R. A., Bierer, S. B., & Dannefer, E. F. (2017). Medical student resilience strategies: A content analysis of medical students' portfolios. *Perspectives on Medical Education, 6*(1), 29-35. https://doi.org/10.1007/s40037-016-0313-1

Ridinger, H., Cvengros, J., Gunn, J., Tanaka, P., Rencic, J., Tekian, A., & Park, Y. S. (2018). Struggling medical learners: a competency-based approach to improving performance. *MedEdPORTAL*, *14*.

Rogers, R. H. (2018). Coding and writing analytic memos on qualitative data: A review of Johnny Saldaña's the coding manual for qualitative researchers. *The Qualitative Report, 23*(4), 889-892.

Rotenstein, L. S., Ramos, M. A., Torre, M., Segal, J. B., Peluso, M. J., Guille, C., … Mata, D.A. (2016). Prevalence of depression, depressive symptoms, and suicidal ideation among medical students: A systematic review and meta-analysis. *JAMA. 316*(21), 2214–2236. https://doi.org/10.1001/jama.2016.17324

Rudland, J. R., Jaye, C., Tweed, M., & Wilkinson, T. J. (2021). Relationships among perceived learning, challenge and affect in a clinical context. *BMC Medical Education*, *21*(1), 1-10.

Saldaña, J. (2016). *The coding manual for qualitative researchers*, 3rd e. Sage.

Schunk, D. H., & Zimmerman, B. J. (1997). Social origins of self-regulatory competence. *Educational psychologist*, *32*(4), 195-208.

Şen, Ş. (2016). Modeling the structural relations among learning strategies, self-efficacy beliefs, and effort regulation. *Problems of Education in the 21st Century*, *71*(1), 62-72.

Slivkoff, M. D., Johnson, C., & Tackett, S. (2021). First-year medical student experiences adjusting to the immediate aftermath of COVID-19. *Medical Science Educator*, *31*, 557-564.

Smith, S. M., & Chen, C. (2017). Modified MSLQ: An analysis of academic motivation, self-regulated learning strategies, and scholastic performance in information systems courses. *Issues in Information Systems*, *18*(3).

Smith, J., & Noble, H. (2014). Bias in research. *Evidence-based nursing*, *17*(4), 100-101.

Soemantri, D., Mccoll, G., & Dodds, A. (2018). Measuring medical students' reflection on their learning: Modification and validation of the motivated strategies for learning questionnaire (MSLQ). *BMC Medical Education, 18* doi:http://dx.doi.org.ezproxylocal.library.nova.edu/10.1186/s12909-018-1384-y.

Sookdeo, S. S. (2016). *The relationship between the utilization of student support services and overall satisfaction in medical school* (Doctoral dissertation, University of South Florida).

Spaulding, M. T. (2019). *Mentor and candidate attributes that promote doctoral persistence and postgraduation scholarship in limited residency and online doctoral programs* (Doctoral dissertation, Regent University).

Stegers-Jager, K. M., Cohen-Schotanus, J., & Themmen, A. P. (2012). Motivation, learning strategies, participation and medical school performance. *Medical education*, *46*(7), 678-688.

Stewart-Brown, S., Mizaya, C., Walker, T., Sabah, J., Hanson, E., & Chilton, A. (2018). Experiences with a universal mindfulness and well-being programme at a UK medical school. *Health Education, 118*(4), 304-319. https://doi.org/10.1108/HE-10-2017-0053

Sverdlik, A., Hall, N. C., McAlpine, L., & Hubbard, K. (2018). The PhD experience: A review of the factors influencing doctoral students' completion, achievement, and well-being. *International Journal of Doctoral Studies*, *13*(1), 361-388.

Takahashi, K., Nin, T., Akano, M., Hasuike, Y., Iijima, H., & Suzuki, K. (2017). Views of Japanese medical students on the work-life balance of female physicians. *International journal of medical education*, *8*, 165.

Terrell, S. R. (2015). *Writing a proposal for your dissertation: Guidelines and examples*. Guilford Publications.

Thompson, G., McBride, R. B., Hosford, C. C., & Halaas, G. (2016) Resilience among medical students: The role of coping style and social support. *Teaching and Learning in Medicine, 28*(2), 174–182. https://doi.org/10.1080/10401334.2016.1146611

Trahan, A., & Laird, K. (2018). The nexus between attribution theory and racial attitudes: A test of racial attribution and public opinion of capital punishment. *Criminal Justice Studies: A Critical Journal of Crime, Law & Society, 31*(4), 352-367. https://doi.org/10.1080/1478601X.2018.1509859

Trullàs, J. C., Blay, C., Sarri, E., & Pujol, R. (2022). Effectiveness of problem-based learning methodology in undergraduate medical education: a scoping review. *BMC medical education*, *22*(1), 104.

Weber, J., Skodda, S., Muth, T., Angerer, P., & Loerbroks, A. (2019). Stressors and resources related to academic studies and improvements suggested by medical students: A qualitative study. *BMC Medical Education, 19.* https://doi.org/10.1186/s12909-019-1747-z

Weingartner, L. A., Sawning, S., Shaw, M. A., & Klein, J. B. (2019). Compassion cultivation training promotes medical student wellness and enhanced clinical care. *BMC Medical Education, 19.* https://doi.org/10.1186/s12909-019-1546

Williams, P., Wall, N. & Fish, W. (2019). Mid-Career Adult Learners in an Online Doctoral Program and the Drivers of Their Academic Self-Regulation: The Importance of Social Support and Parent Education Level. *International Review*

of Research in Open and Distributed Learning, *20*(1). https://doi.org/10.19173/irrodl.v20i1.3789

Williams-Shakespeare, E., Bronteng, J. E., & Alahmari, A. (2018). Interpersonal hardiness as a critical contributing factor to persistence among international women in doctoral programs: A trioethnographic study. *The Qualitative Report, 23*(8), 1799-1822.

Yin, R.K. (2009). *Case study research: Designs and methods* (3rd ed.). Thousand Oaks, CA: Sage.

Yin, R.K. (2014). *Case study research: Designs and methods* (5th ed.). Thousand Oaks, CA: Sage.

Zheng, B., Chang, C., Lin, C. H., & Zhang, Y. (2021). Self-efficacy, academic motivation, and self-regulation: how do they predict academic achievement for medical students?. *Medical Science Educator*, *31*, 125-130.

Zhong, Q., Wang, H., Christensen, P., McNeil, K., Linton, M., & Payton, M. (2021). Early prediction of the risk of scoring lower than 500 on the COMLEX 1. *BMC Medical Education, 21*, 1-10. http://doi/10.1186/s12909-021-02501-5

Zoom Video Communications Inc. (2020). Automatically transcribe cloud recordings. Retrieved from https://support.zoom.us/hc/en-us/articles/115004794983-Automatically-Transcribe-Cloud-Recordings-.

Appendix A

Osteopathic Medical Student Flyer

College of Osteopathic Medicine

M3 AND M4 OSTEOPATHIC MEDICAL STUDENTS NEEDED

My name is Natacha Villedrouin, and I am a Higher Education Leadership Doctoral Student from the Abraham S. Fischler College of Education and School of Criminal Justice at Nova Southeastern University. I am looking for osteopathic medical students to participate in a research study.

TITLE OF THE STUDY

A Case Study Investigating the Strategies Used by Preclinical Osteopathic Medical Students to Successfully transition to their clinical years.

PURPOSE OF THIS STUDY

To explore the strategies used by osteopathic medical students to navigate the academic and personal challenges faced during their preclinical years to persist and successfully transition into the clinical years.

As a participant of this study, you will be asked to complete an online questionnaire to investigate the strategies used to navigate the academic and personal challenges faced during your preclinical years to persist and successfully transition into the clinical years of the medical program.

Your participation in this study will involve 20 minutes of your time and is voluntary and confidential. There is minimal to no risk of participating in this study.

If you have read the attached letter and voluntarily wish to participate in this research study, please click on the survey link below.

LINK TO SURVEY:

Strategies for Learning Questionnaire for Medical Students

For further information about this study, please contact:
Natacha Villedrouin, M.S.
Nova Southeastern University
Abraham Fischler School of Education
Doctoral Student: Principal Investigator
Email: nvilledrou@nova.edu

Appendix B

Participant Letter and General Informed Consent Form

Participant Letter and General Informed Consent Form
Consent to be in a Research Study Entitled
A Case Study Investigating the Strategies Used by Preclinical Osteopathic Medical Students to Successfully Transition to their Clinical Years.

Who is doing this research study?

College: Abraham S. Fischler College of Education and School of Criminal Justice at Nova Southeastern University.

Principal Investigator: Natacha Villedrouin, M.S. in Psychology

Faculty Advisor/Dissertation Chair: Vanaja Nethi, Ph.D.

Site Information: Nova Southeastern University Tampa Bay Regional Campus, 3400 Gulf to Bay Blvd., Clearwater Fl.

Funding: Unfunded

What is this study about?

The purpose of this study is to investigate the strategies used by osteopathic medical students to navigate the academic and personal challenges faced during their preclinical years to persist and successfully transition into the clinical years. This study would benefit medical educators who teach the courses during the preclinical years to the incoming medical students. It would benefit the medical school stakeholders such as faculty, staff, administration, and clinicians who work with the students to understand the support students need and how to best advise them.

Why are you asking me to be in this research study?

You are being asked to take part in this research study because you meet the inclusion criteria being a medical student currently enrolled in the Doctor of Osteopathic Medicine program at Nova Southeastern University KPCOM, are a member of the Class of 2024 (M3) or Class of 2023 M4), have an official Nova Southeastern University email, and are 18 years or older.

What will I be doing if I agree to be in this research study?

While you are taking part in this research study, you will be completing an online questionnaire. The questionnaire will take approximately 20 minutes to complete. You may choose to volunteer in a follow-up interview to investigate the specific strategies students used to navigate challenges during their preclinical years.

Are there possible risks and discomforts to me?

This research study involves minimal risk to you. To the best of our knowledge, the things you will be doing have no more risk of harm than you would have in everyday life.

What happens if I do not want to be in this research study?
You have the right to leave this research study at any time, or not be in it. If you do decide to leave or you decide not to be in the study anymore, you will not get any penalty or lose any services you have a right to get. If you choose to stop being in the study, any information collected about you **before** the date you leave the study will be kept in the research records for 36 months from the end of the study but you may request that it not be used.

What if there is new information learned during the study that may affect my decision to remain in the study?
If significant new information relating to the study becomes available, which may relate to whether you want to remain in this study, this information will be given to you by the investigators. You may be asked to sign a new Informed Consent Form, if the information is given to you after you have joined the study.

Are there any benefits for taking part in this research study?
There are no direct benefits from being in this research study. We hope the information learned from this study will help future osteopathic medical students successfully navigate challenges they may face during their preclinical years.

Will I be paid or be given compensation for being in the study?
You will not be given any payments or compensation for being in this research study.

Will it cost me anything?
There are no costs to you for being in this research study.

How will you keep my information private?
Information learned about you in this research study will be handled in a confidential manner, within the limits of the law and will be limited to the investigator. This data will be available to the researcher and the Institutional Review Board. If the results of the study is published in a scientific journal or book, you will not be identified. All confidential data will be kept securely. Study data will be maintained in a password protected folder on OneDrive by the PI. All data will be kept for 36 months from the end of the study and destroyed after that time by deleting the files associated with the survey including all responses.

Will there be any Audio or Video Recording?
If you choose to participate in the follow-up interview, it will involve an audio and/or video recording. This recording will be available to the researcher, the Institutional Review Board and other representatives of this institution, and any of

the people who gave the researcher money to do the study (if applicable). The recording will be kept, stored, and destroyed as stated in the section above. Because what is in the recording could be used to find out that it is you, it is not possible to be sure that the recording will always be kept confidential. The researcher will try to keep anyone not working on the research from listening to or viewing the recording.

What Student/Academic Information will be collected and how will it be used?
The following information will be collected from student educational records, COMLEX Level 1 Board scores. These records will be used to verify the number of attempts needed to pass the COMLEX Level 1 Board exam. These records will be given to the Principal Investigator by the Office of Medical Education.

Whom can I contact if I have questions, concerns, comments, or complaints?

If you have questions now, feel free to ask us. If you have more questions about the research, your research rights, or have a research-related injury, please contact: Natacha Villedrouin at nvilledrou@nova.edu.
Primary contact:
Natacha Villedrouin, M.S., can be reached at nvilledrou@nova.edu

Research Participants Rights
For questions/concerns regarding your research rights, please contact:

Institutional Review Board
Nova Southeastern University
(954) 262-5369 / Toll Free: 1-866-499-0790
IRB@nova.edu

You may also visit the NSU IRB website at www.nova.edu/irb/information-for-research-participants for further information regarding your rights as a research participant.

Research Consent & Authorization Signature Section

Voluntary Participation - You are not required to participate in this study. In the event you do participate, you may leave this research study at any time. If you leave this research study before it is completed, there will be no penalty to you, and you will not lose any benefits to which you are entitled.

If you agree to participate in this research study, sign this section. You will be given a signed copy of this form to keep. You do not waive any of your legal rights by signing this form.

SIGN THIS FORM ONLY IF THE STATEMENTS LISTED BELOW ARE TRUE:

- You have read the above information.
- Your questions have been answered to your satisfaction about the research

Adult Signature Section

I have voluntarily decided to take part in this research study.

Printed Name of Participant	Signature of Participant	Date
Printed Name of Person Obtaining Consent and Authorization	Signature of Person Obtaining Consent & Authorization	Date

Appendix C

Strategies for Learning Questionnaire for Medical Student

Strategies for Learning Questionnaire for Medical Students

Demographic Information

1. Gender (if you are willing to share) _____
2. Medical class year: (Circle one) M3_____ M4_____
3. Age _____
4. Ethnic Background: (Circle one) White/Caucasian Black/Afro-American Hispanic Asian Other
5. How many hours per week do you work for pay? _____
6. How many hours a week do you spend studying for your courses? _____
7. How many times did you attempt the COMLEX Level 1 to pass it?_____
8. If you are comfortable with doing a follow up interview, please provide me with an email and phone number to contact you _____

Please answer the following items based on your behavior during your preclinical courses.

1. Describe a specific learning strategy you implemented when learning exam/lecture material.
2. If a class lecture was difficult to understand, how did you attempt to learn the material?
3. What did you do during class lectures when you found yourself missing important points because you were distracted or unable to focus on the topic at hand?
4. How did you go back and clarify lecture topics when you were uncertain about something for the course?
5. Provide an example of how you engaged in active learning and recall to ensure comprehension of the course material (ex: flashcards, making practice questions, quizzing etc.)?
6. Provide an example of how course material was applicable to a real-world scenario and how that impacted your learning.
7. When studying for your courses, what did you do to set goals for yourself to keep you motivated and direct your activities in each study period?
8. Provide an example of the medical education resources that you used and found helpful during your preclinical years?
9. What strategies did you use to prepare for the COMLEX Level 1 to successfully pass?
10. Describe the type of support you sought from medical school staff which helped you to navigate through academic challenges to successfully pass your preclinical courses or the COMLEX Level 1?

Appendix D

Osteopathic Medical Student Interview Participation Letter

Osteopathic Medical Student Interview Participation Letter

Date:

Dear Study Participant,

My name is Natacha Villedrouin, and I am a Higher Education Leadership Doctoral Student from the Abraham S. Fischler College of Education and School of Criminal Justice at Nova Southeastern University. I am conducting an applied dissertation study entitled: A Case Study of the Strategies Used by Osteopathic Medical Students for Navigating Challenges During the Preclinical Years.

The study will utilize a qualitative methodology to gain insight from the osteopathic medical students to examine the specific strategies used to navigate the academic and personal challenges faced during their preclinical years to persist and successfully transition into the clinical years of the medical program. Currently, a lack of information exists on the perspective of current osteopathic medical students. I am interested in your views on this topic. The interviews should take no more than 60 minutes.

For this study, the inclusion criteria will require that students self-identify as (**a**) having faced challenges during their preclinical years of medical school which affected their academic performance, (**b**) having strategies to navigate through those challenges, and (**c**) having strategies and methods to successfully transition into their clinical years of the program.

Your participation in this study is voluntary. If you choose to be a part of study, please be aware that you will be free to withdraw at any time. There are no risks associated with the participation in this study. There are no direct benefits to you for participating in this study. The results from this study will add to the body of knowledge regarding the strategies used by osteopathic medical students to achieve academic success and attain school-work-life balance while in medical school.

The research study will not reveal any personal information of any participants. The information from this study will be kept confidential. Your name, class year, and/or any other identifying information will not be linked to the data in the final written report. Your consent to participate is implied by the completion of the consent form.

If you are interested in supporting my study or have any questions, please contact me at the listed information below.

Sincerely,

Natacha Villedrouin, M.S.
Nova Southeastern University
Abraham Fischler School of Education
Doctoral Student: Principal Investigator
Email: nvilledrou@nova.edu

NSU IRB Protocol Number 2022-458

Appendix E

Qualitative Interview Protocol

Qualitative Interview Protocol

Date:_____ **Interviewer:** Natacha Villedrouin

Participant Code:_____

Medical School Year of Participant:

Purpose of the study: The purpose of this qualitative case study will be to investigate, identify, and describe the specific strategies used by osteopathic medical students to navigate the academic and personal challenges faced during their preclinical years to persist and successfully transition into the clinical years of the medical program in a large medical school in South Florida.

Consent form signed: _____

Consent to record interview: _____

Demographic Questions

1. Gender (if you are willing to share) _____
2. What year did you graduate high school? _____
3. Medical class year: (Circle one) M3_____ M4_____
4. Age _____
5. Ethnic Background: (Circle one) White/Caucasian Black/Afro-American Hispanic Asian Other_____
6. How many hours per week do you work for pay? _____
7. How many hours a week do you spend studying for your courses? _____

Semi-structured Interview Questionnaire:

1. What would you say were the greatest challenges that you faced during your preclinical years of medical school?
    a. Describe how you navigated through those challenges, including what strategies you used to balance family? stress? Personal time? Time with friends?
    b. Which of these proved to be the most successful and why?
    c. What would you do differently to address those challenges now?
2. How many times did you attempt the COMLEX Level 1 to pass it?_____

   a. Describe the strategies you used to prepare for your first attempt?
   b. If you attempted more than once- what did you do differently to prepare for your second or third attempt of the exam?
3. Describe the type of support you sought from medical school staff which helped you to navigate through academic challenges to successfully pass the COMLEX Level 1?
4. Describe the strategies you used to keep yourself motivated as you focused on transitioning into the clinical years?
   a. Which of these proved to be the most successful and why?
5. Describe the strategies you used to navigate through responsibilities at home and at school during your preclinical years of medical school?
6. Describe any compromises you may have had to make during your preclinical years of medical school?
   a. How did that affect you academically or personally?
7. Describe the activities you engaged in that gave you rest, or a mental health boost, from your regular academic and personal obligations during the preclinical years of medical school?
8. What else would you like to share about the strategies you used to create balance in your life that would help future medical students during their preclinical years of undergraduate medical education?

Appendix F

Table of Specification

Table of Specification

Central Question:	**How do students in their preclinical years navigate challenges and successfully transition into their clinical years, in an osteopathic medical program at a private university in Florida?**			
Interview Questions	**Research Question 1: What are the specific strategies used by this group of students that relate to Bandura's theory of self-efficacy?**	**Research Question 2: What are the specific strategies used by this group of students that relate to Kelley and Michela's interpretation of attribution theory?**	**Research Question 3: What strategies have the students who passed the COMLEX Level 1 reported to have used to be successful on the first attempt?**	**Research Question 4: What strategies have the students who required more than one attempt to pass the COMLEX Level 1 used to successfully passed the exam?**
	-Social Learning Theory -Performance Accomplishments -Modeling -Verbal persuasion -Physiological states (Mental) -Self-efficacy -Motivation	-Motivations for personal wellbeing --Seeking support -Self-enhancements and protection -Empowerment -Resilience	-Performance accomplishments and self-efficacy -Motivation and persistence	-Seeking medical school support. -Motivation and resilience
The online Modified MSLQ	**X**			
1. What would you say were the greatest challenges that you faced during your preclinical years of medical school? a. Describe how you navigated through those challenges, including what strategies you used to balance family? stress? Personal time? Time with friends? b. Which of these proved to be the most successful and why? c. What would you do differently to address those challenges now?		**X**		

2. How many times did you attempt the COMLEX Level 1 to pass it? **a .**Describe the strategies you used to prepare for your first attempt? **b.** If you attempted more than once- what did you do differently to prepare for your second or third attempt of the exam?			**(a) X**	**(b) X**
3. Describe the type of support you sought from medical school staff which helped you to navigate through academic challenges to successfully pass the COMLEX Level 1?		**X**		
4. Describe the strategies you used to keep yourself motivated as you focused on transitioning into the clinical years?			**X**	
5. Can you describe the strategies you used to navigate through responsibilities at home and at school during your preclinical years of medical school?		**X**		
6. Describe any compromises you may have had to make during your preclinical years of medical school? a. How did that affect you academically or personally?		**X**		
7. Describe the activities you engaged in that gave you rest, or a mental health boost, from your regular academic and personal obligations		**X**		

during the preclinical years of medical school?				
8. What else would you like to share about the strategies you used to create balance in your life that would help future medical students during their preclinical years of undergraduate medical education?	**X**			

.

Appendix G

Site Approval Letter

Nova Southeastern University
3301 College Avenue
Fort Lauderdale, FL 33314-7796

Subject: Site Approval Letter

To whom it may concern:

This letter acknowledges that I have received and reviewed a request by Natacha Villedrouin to conduct a research project entitled "A Case Study Investigating the Strategies Used by Preclinical Osteopathic Medical Students to Successfully transition to their clinical years" at Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine and I approve of this research to be conducted at our facility.

When the researcher receives approval for his/her research project from the Nova Southeastern University's Institutional Review Board/NSU IRB, I agree to provide access for the approved research project. If we have any concerns or need additional information, we will contact the Nova Southeastern University's IRB at (954) 262-5369 or irb@nova.edu.

Sincerely,

Elaine Wallace, D.O., M.S., M.S., M.S., M.S.
Dean

Appendix H

Raw Data Codes, Categories and Themes for Research Question 1

Raw Data Codes	Categories	Themes
Self-Studied	self-regulation	Self-regulation of learning
repetition	self-regulation	Self-regulation of learning
Organization	organization strategies	Self-regulation of learning
Time management	purposeful management of time	Self-efficacy
using other resources	self-regulation	Self-regulation of learning
using outside resources	self-regulation	Self-regulation of learning
set timer	purposeful management of time	Self-efficacy
did not ask for help	did not seek academic support	Self-regulation of learning
did not seek help	did not seek academic support	Self-regulation of learning
rewatched lectures/videos	learning strategies	Self-efficacy
reviewed lectures/videos	learning strategies	Self-efficacy
using supplemental information	self-regulation	Self-regulation of learning
rewind	learning strategies	Self-efficacy
make questions	learning strategies	Self-efficacy
create questions	learning strategies	Self-efficacy
did not attend lectures	self-regulation	Self-regulation of learning
no contact with staff	did not seek academic support	Self-regulation of learning
take notes and synthesize	elaboration strategies	Self-regulation of learning
unwelcome faculty environment	did not seek academic support	Self-regulation of learning
faculty not helpful	did not seek academic support	Self-regulation of learning
self-realization	self-regulation	Self-regulation of learning
relisten	learning strategies	Self-efficacy
used Pomodoro method	learning strategies	Self-efficacy
practice questions	learning strategies	Self-efficacy
used a planner	organization strategies	Self-regulation of learning
watched online lectures only	self-regulation	Self-regulation of learning
Annotate	elaboration strategies	Self-regulation of learning
Attend study tables	self-regulation	Self-regulation of learning
Explained concept to myself	analyzing and applying	Critical thinking strategies
control learning at my own pace	self-regulation	Self-regulation of learning
watching lectures at 2x speed	learning strategies	Self-efficacy
helped during clinical years	analyzing and applying	Critical thinking strategies
helped during rotations	analyzing and applying	Critical thinking strategies
breakdown material in smaller sections	elaboration strategies	Self-regulation of learning

divide material into smaller portions	elaboration strategies	Self-regulation of learning
practice questions for synthesis	learning strategies	Self-efficacy
recall	analyzing and applying	Critical thinking strategies
reread powerpoint presentations	self-regulation	Self-regulation of learning
study very hard	self-regulation	Self-regulation of learning
Try to hear it with a different explanation.	analyzing and applying	Critical thinking strategies
take breaks	purposeful management of time	Self-efficacy
summarized lectures	elaboration strategies	Self-regulation of learning
do practice questions	learning strategies	Self-efficacy
make and review quizlets	learning strategies	Self-efficacy
Reading slides provided by professors 3 times	learning strategies	Self-efficacy
Took a break, then returned to studying	self-regulation	Self-regulation of learning
I would do anki decks	learning strategies	Self-efficacy
write down the important information on a board or notebook.	learning strategies	Self-efficacy
anki	learning strategies	Self-efficacy
I looked up the information myself for accuracy	analyzing and applying	Critical thinking strategies
looked at slides and self-studied	self-regulation	Self-regulation of learning
I used Anki which was the best resource for me.	learning strategies	Self-efficacy
I would write out a concept and double check to make sure my condensed version was accurate.	learning strategies	Self-efficacy
focus on the big picture	analyzing and applying	Critical thinking strategies
rewind, 2x speed lectures	learning strategies	Self-efficacy
summarize the slides	elaboration strategies	Self-regulation of learning
Repetition of material	learning strategies	Self-efficacy
would break the lecture down into smaller parts by writing out the general topic	analyzing and applying	Critical thinking strategies
set objectives to finish	learning strategies	Self-efficacy

Made a schedule for myself	organization strategies	Self-regulation of learning
space repetition	self-regulation	Self-regulation of learning
I would go back and re-teach myself the material	elaboration strategies	Self-regulation of learning
made my own study guides	learning strategies	Self-efficacy
Writing out to-do lists and keeping a calendar of tasks to keep up with studying	organization strategies	Self-regulation of learning
research the topic using outside resources	learning strategies	Self-efficacy
summarized everything high yield	self-regulation	Self-regulation of learning
I would look up answers online	self-regulation	Self-regulation of learning
took a break/walk and then come back so I could focus	self-regulation	Self-regulation of learning
reading my notes out loud	elaboration strategies	Self-regulation of learning
Watching videos	self-regulation	Self-regulation of learning
rereading the material.	self-regulation	Self-regulation of learning
note taking, color coordinating, spaced repetition, verbal review	learning strategies	Self-efficacy
youtube videos to help understand bigger concepts and apply them to the course work	analyzing and applying	Critical thinking strategies
watch lectures at later times when I could better focus on the material.	self-regulation	Self-regulation of learning
Researched objectives and material after lecture	elaboration strategies	Self-regulation of learning
I never attended lecture.	self-regulation	Self-regulation of learning
tried to avoid attending live lectures	self-regulation	Self-regulation of learning
I had all the lectures outlined and would make sure I felt good about all the lectures	learning strategies	Self-efficacy
I would take a 20 minute break and let my mind reset.	purposeful management of time	Self-efficacy
Just kept going and trying to do as much as I could	self-regulation	Self-regulation of learning

I would try and focus on taking active notes	self-regulation	Self-regulation of learning
medical school staff was never helpful.	did not seek academic support	Self-regulation of learning
medical school staff was unavailable and unapproachable during board preparation	did not seek academic support	Self-regulation of learning
Reviewing lecture handouts prior to attending lecture allowed me to have a basis on what to focus on and where to ask for clarification.	analyzing and applying	Critical thinking strategies
Looking at outside material to better understand the subject	learning strategies	Self-efficacy
I did not get any nor did I ask for it	self-regulation	Self-regulation of learning
I was able to see many pathologies discuss in previous lectures and having baseline knowledge before seeing it in real life helped fortify my understanding	analyzing and applying	Critical thinking strategies
Medication names were much more familiar in real world settings and easier to remember since I had seen them before.	analyzing and applying	Critical thinking strategies
I used the knowledge during clinicals and my patients' presentation in turn reinforced what I learned in class	analyzing and applying	Critical thinking strategies
none, preclinical wasn't helpful. I used uworld and anki solo.	self-regulation	Self-regulation of learning
Pharmacology comes up constantly third year during clinicals and is constantly reinforced when asked how drugs work or which drugs to use	analyzing and applying	Critical thinking strategies
PCM discussion style classes were helpful to learn how to	analyzing and applying	Critical thinking strategies

present cases and work on differential diagnoses, this was one of the most helpful courses to prepare me for presenting in the hospital and clinic to preceptors.		
I feel like those experiences helped during studying during M1 and M2 year.	analyzing and applying	Critical thinking strategies
I was able to diagnose depression multiple times using mneumonics and other methods in class	analyzing and applying	Critical thinking strategies
I squeezed in studying between patients, while driving, between changing dirty diapers. I'm not familiar with having an actual period of time dedicated to studying.	purposeful management of time	Self-efficacy
A lot of common pathology I learned ended up showing up in clinical rotations.	analyzing and applying	Critical thinking strategies
decided to create my own personalized resource	self-regulation	Self-regulation of learning
I knew I couldn't study at home because of family life so I just got it done everyday	purposeful management of time	Self-efficacy

Appendix I

Raw Data Codes, Categories and Themes for Research Question 2

Raw Data	Categories	Themes
working with peers	working with peers	Peer learning
I looked forward to the activities I could do afterward.	goal oriented	Internal goal orientation
Help from faculty	Seeking faculty support	Help seeking
help from staff	Seeking faculty support	Help seeking
motivation	internal motivation	Internal goal orientation
setting goals	goal oriented	Internal goal orientation
family support	Seeking family support	Help seeking
fear of failing	internal abilities	Internal goal orientation
reward myself	Internal motivation	Internal goal orientation
group study	working with peers	Peer learning
allow myself	internal motivation	Internal goal orientation
reward myself	internal motivation	Internal goal orientation
looked forward to activities I could do after	goal oriented	Internal goal orientation
accountable	internal abilities	Internal goal orientation
asked friends	working with peers	Peer learning
try to keep up	internal abilities	Internal goal orientation
have classmates quiz me	working with peers	Peer learning
asked classmates	working with peers	Peer learning
Email lecturer	Seeking faculty support	Help seeking
check discussion board for clarification	Seeking faculty support	Help seeking
Studied in groups/asked a classmate	working with peers	Peer learning

tutoring	seeking professional help	Help seeking
in person quizzing	working with peers	Peer learning
sense of reward and that was my motivation	internal motivation	Internal goal orientation
Asked the professor via email usually	Seeking faculty support	Help seeking
work with friends	working with peers	Peer learning
focus	goal oriented	Internal goal orientation
set goals	goal oriented	Internal goal orientation
hard work, dedication, time-management	goal oriented	Internal goal orientation
I kept track of my progress	goal oriented	Internal goal orientation
engaging in structured group study with 2-3 people.	working with peers	Peer learning
required myself to get through all	Internal motivation	Internal goal orientation
Meeting with advisor.	Seeking faculty support	Help seeking
Attended Dr. Nguyen's review lecture	Seeking faculty support	Help seeking
Met with academic advisor for planning	Seeking faculty support	Help seeking
I would make fun plans for the weekend and set a goal of how many lectures I wanted to get done before that event.	goal oriented	Internal goal orientation
Would have something to look forward to at the end of the study period.	goal oriented	Internal goal orientation
Mainly motivated by the pressure of needing to do well	internal abilities	Internal goal orientation
had to hit a certain amount and it had to be a meaningful	goal oriented	Internal goal orientation
assess why i was having difficulty concentrating	internal abilities	Internal goal orientation
I just set goals for covering a certain amount of topics each week. I was rewarded with breaks and social time.	goal oriented	Internal goal orientation

If i study for x amount of hours then i could watch an episode of my favorite show	goal oriented	Internal goal orientation
I do well with weekly goals.	internal abilities	Internal goal orientation
tried to sleep more	well-being	Help seeking
the pressure to get through all the lectures before the exam is what motivated me to study.	internal motivation	Internal goal orientation
just to do the best i can everyday	internal abilities	Internal goal orientation
Academic advisor was incredibly helpful	Seeking faculty support	Help seeking
utilized tutoring services from study tables- offered immense help!	Seeking faculty support	Help seeking
Academic counseling was very helpful	Seeking faculty support	Help seeking
Honestly not a lot, found it easier and more helpful to get help through upperclassmen and alumni	working with peers	Peer learning
The main people which were helpful were the MBS tutors.	working with peers	Peer learning
Academic Advisor was very helpful in her approach to study design. She helped me break down my goals into a weekly and daily amount which was doable, and because of her clinical background, she understood the complexity of working in clinic during the day and how much could realistically be studied at night.	Seeking faculty support	Help seeking
I had several meetings with the academic advisors who helped lay out study strategies for Comlex level 1.	Seeking faculty support	Help seeking
ask a classmate or upperclassmen	working with peers	Peer learning
I would ask my classmates that I studied with for clarification on topics I would be uncertain about.	working with peers	Peer learning
I leaned on my fellow students for support	working with peers	Peer learning
helping me create a study schedule.	Seeking faculty support	Help seeking

They also provided tons of emotional support.	Seeking faculty support	Help seeking
When I was struggling academically I reached out to a professor and club mentor for one of the clubs I served on the board of. She was so kind and understanding and really took the time to tell me exactly what steps to take when I explained how overwhelmed I was feeling. Honestly, it felt like the first time someone at the school really cared about my mental and physical health and me as a person.	Seeking faculty support	Help seeking
I didn't really search for support from school staff, though they provided me with resources for board studying; a lot of my support was emotional support from fiancé and friends also studying	Seeking family support	Help seeking
Most help was student led with review sheets.	working with peers	Peer learning
I had my goals set high, so that I may land lower. Also making time for breaks are very important.	goal oriented	Internal goal orientation
I kept reminding myself that I can't afford to fail	internal abilities	Internal goal orientation
I would remind myself that if I stayed on course and studied hard during those 2 weeks, that after my exam I could hang out with friends, go to the beach, and relax for a weekend.	internal motivation	Internal goal orientation
I tried to stay consistent and took 2-3 practice exams to ensure I was ready.	goal oriented	Internal goal orientation
I used to tell myself to get X amount of lectures done in a day before doing anything else.	goal oriented	Internal goal orientation
I realized that I needed to give more attention to maintain my mental health	well-being	Help seeking
Academic advisor listened to me cry, and helped prioritize my mental health and healing. She provided resources that were imperative to my success.	Seeking faculty support	Help seeking

Appendix J

Raw Data Codes, Categories, and Themes for Research Question 3

Participants	Raw Data Codes	Categories	Themes
Participants 5	but I would say the biggest one for me. It was- I had had 2 Gap years, where I worked as a medical assistant, and I forgot how to sit down and actually study. It was really bad.	learning challenge	learning strategies
Participants 5	I would like, get up like every like 5 or 10 min, and would feel like I was like reading something, but I would. I would read it, and then read it again and again.	learning challenge	learning strategies
Participants 5	so I guess, like getting back in the groove of studying and figuring out how like remembering how I learned best- was one of the biggest challenges for me.	self-regulation	self-regulation of learning
Participants 5	He is absolutely fantastic. He is absolutely fantastic.	Time with family	work-life-balance
Participants 5	I feel like a lot of times. People struggle with life stress and like laundry and clean your house, and just kind of like navigating like home life.	work-life-balance	work-life-balance
Participants 5	my mom, we actually live a quarter mile down the road from her. So we live by ourselves. But she is right down the road. I go over every night for dinner, and she makes home cooked meals and I block that out as my family time	Time with family	work-life-balance
Participants 5	my me time I go, I reset mentally. Its therapeutic.	prioritizing mental health	work-life-balance
Participants 5	I did significantly less U-world questions than everyone else when I took it. I think when I took I had only I think maybe 15-20% of U-World Question Bank	learning strategies	learning strategies
Participants 5	I had done a lot of like in-depth Review.	learning strategies	learning strategies
Participants 5	When I did the questions, so I found that my course improved quicker than my peers, because when I would go through it, I would make sure- I read the answer choices, and towards the end of my studying I could predict based on the answer choices what the question was asking,	learning strategies	learning strategies
Participants 5	So I feel like by being targeted in my approach to like the test taking skills and what they were asking, why they were asking and figuring out the differential that they were trying to identify in the questions them, and how they were trying to trick me.	learning strategies	learning strategies
Participants 5	helped not only there with the questions, but I feel like that's also helped in clinical years.	analyzing and applying	learning strategies
Participants 5	I feel like I also like to understand more of the pathology, and, like the pathophysiology.	learning strategies	learning strategies
Participants 5	I think almost twice through all of pathoma. but I had not done that during the clinical or the pre-system classes and then I went through a lot of the sketchy videos and tried to understand more of the drugs and the microbiology.	learning strategies	learning strategies

Participants 5	So a lot of a lot of learning. And then, when I would do, the question was kind of when I would test that learning, and I found that by doing the learning that was the question that I would get right.	testing strategies	learning strategies
Participants 5	I would be like oh, I remember this, or if I got them wrong, I never got the wrong again.	self-regulation	self-regulation of learning
Participants 5	or even like their sister questions so like, when they would have the answer choice to something else. I would. I would know, because I've gotten that one question wrong. I knew better for all of the other options.	analyzing and applying	learning strategies
Participants 5	I would be really stressed, i'm like, Can I really do this? Which I mean, I never really asked very often, is it for me more so? I was like, how am I going to do this?	internal motivation	self-regulation of learning
Participants 5	the more I know the more I can teach them, and the better I know is the better I'm able to break it down for them.	goal oriented	self-regulation of learning
Participants 5	something that I think was one of the main issues in the beginning, I thought more was more, but for me, less is more.	self-regulation	self-regulation of learning
Participants 5	When I really hit my stride and hit my groove. I think maybe, if I was lucky I studied anywhere from 2 to 4 h a day for my clinical classes, for all of them, and then I would study probably closer to 6 to 8, the 2 to 3 days before an exam.	self-regulation	self-regulation of learning
Participants 5	I could never focus that long. I would never get good studying that long. so that when I prioritized sleep, I function better. I study better. I remembered more	self-regulation	self-regulation of learning
Participants 5	So I prioritize sleep. I didn't sacrifice sleep very often, if ever unless it was like a night before a test where I had made sure I slept the night leading up to it, and then getting 6 or 7 h.	personal well-being	work-life-balance
Participants 5	do what I can to make it happen.	goal oriented	self-regulation of learning
Participants 5	Fingers crossed it keeps going	goal oriented	self-regulation of learning
Participants 5	there's so many other things that I wanted to do	goal oriented	self-regulation of learning
Participants 5	And I do a lot of research. I do a lot of like with you like the mentorship, the student ambassadors, I that that's what I enjoy that built me back up	goal oriented	self-regulation of learning
Participants 5	And I do a lot of research. I do a lot of like with you like the mentorship, the student ambassadors, I that that's what I enjoy that built me back up	goal oriented	self-regulation of learning
Participants 5	i'll make the time. I don't know where. But the time will come. if i'm faithful, i'm like, okay. so I mean. I feel like there's so many other things that if you are focus in your 4 hours that you say i'm gonna do this.	goal oriented	self-regulation of learning

Participants 5	I would count how many days I have the last exam, and then the next upcoming them, and I would divide the number of lectures per day per subject I needed to do to stay on track and then review on the weekend.	organization strategies	learning strategies
Participants 5	I would check myself into the library study room, and I would joke I was checking myself into, You know, a mental hospital room, i'd be crazy to spend a whole day afterwards studying,	organization strategies	learning strategies
Participants 5	I found that I couldn't rest until I knew I was ready. But then I went home, and I rested, and I took the next morning off, for me. I found that that was way more restful.	purposeful management of time	purposeful management of time
Participants 5	I think that it was just being strategic	organization strategies	learning strategies
Participants 5	I'm not gonna let the laundry pile up. I'm just gonna do the dishes in the sink. or throw a load of laundry in. or I'm going to do it on a break when I can't look at the computer anymore or I can't study any more	organization strategies	learning strategies
Participants 5	But you are at least getting up and moving around in a productive way. For me, Cleaning is also kind of therapeutic. Not the process, but the clean space afterwards. So I felt like that helped a bit as wellfor productivity after.	personal well-being	work-life-balance
Participants 5	I felt like I was more productive afterwards.	purposeful management of time	purposeful management of time
Participants 5	It was mostly that I didn't have to compromise, because I would like I would work my schedule around his and around my mom schedule.	work-life-balance	work-life-balance
Participants 5	So I know his day off is Tuesday, so i'll work through the weekend and take a Tuesday off or Another good day off, and instead, like kind of structure, my time where I get all the work done, I spend the time studying, and doing research, and contributing to my other commitment.	work-life-balance	work-life-balance
Participants 5	Weekends were typically my catch up and when I actually studied, because those are the busy times for the restaurant. so I guess I didn't I feel like had to sacrifice so much as I compromised, and I worked with what I had. So I don't really feel like I had to take a lot of sacrificing.	self-regulation	self-regulation of learning
Participants 5	my family is priority to me. But I don't really spend very much time with friends outside of the school. so if we went to lab. I would see people, but I didn't. I don't hang out with people outside of school very often.	work-life-balance	work-life-balance
Participants 5	movie night in after a day of studying is enough for me to kind of recharge a little bit.	self-care	work-life-balance

Participants 5	Spending time with families. I have a ten year old brother, like hanging out playing board game, watching like even kids movies, like I love kids. So just doing something like that, exercising when I can.	work-life-balance	work-life-balance
Participants 5	even just going to the gym and riding the bike while you watched a tv show, things like that. And I felt like we're kind of how I disconnected, and took care of myself.	self-care	work-life-balance
Participants 5	remembering how you learn going into school with the mindset that it doesn't matter what everyone else is doing. and to kind of like, stay in your own lane, like just because this works for someone doesn't mean that that's what will work for you.	learning challenge	learning strategies
Participants 5	And your study schedule doesn't have to look like anybody else's it doesn't mean you're not working just as hard. because you're working in a way that is most efficient for you.	purposeful management of time	purposeful management of time
Participants 5	B-knowing what's important to you and knowing how you recharge like,	self-care	work-life-balance
Participants 5	i'm always gonna get my family time in. I'm always going to get my sleep in, and school is the next most important thing	personal well-being	work-life-balance
Participants 5	you don't get something in exactly the time frame that you had originally imagined, it not the end of the world, and to give yourself grace, I think, above all, is one of the most important things.	personal well-being	work-life-balance
Participants 5	Do you want it to be hard because you can't find the motivation to do your work, or do you want it to be hard because you did your work. And then you made good grades. Choosing your hard.	self-regulation	self-regulation of learning
Participants 5	Skimming lecture notes for overarching themes, then watching lectures and writing notes. A 3rd pass with the material reviewing it was great if I had the time	learning strategies	learning strategies
Participants 5	For Dr. Mayrovitz, I would watch the lectures twice. Once at regular speed and then a bit faster and take notes so I could really understand how it worked. Then I'd review his notes at least once or twice	learning strategies	learning strategies
Participants 5	I would force myself to take notes or make anki cards for myself with points they stressed. Even the act of making the anki cards was helpful since I rarely had time to use them	learning strategies	learning strategies
Participants 5	I would talk to my friends, reread notes all the way through to make sure I wasn't missing something, and then google supplementary videos	Working with peers	self-regulation of learning

Participants 5	I would often make anki cards while reviewing broad concepts during my first pass or while right after watching the lectures while the material was fresh. Occasionally, I would talk through concepts conversationally with peers.	learning strategies	learning strategies
Participants 5	I had a patient in FM clinic with a complex rheumatologist presentation. My preceptor let me do a bunch of research and would talk through the case with me as though we were on Dr. House. She was being followed by multiple specialists so I had all of the labs I could want. I'm significantly more confident in my ability to work up a rheumatologic patient now.	internal abilities	self-regulation of learning
Participants 5	The day of an exam I would always go to a study room and then force any last bits of productivity out. My first order of business was to count how many days (excluding weekends) that I had until the next exam and then how many lectures we had on that exam. I'd do some simple math and remind myself during the week that if I wanted to only review the weeks material and not need to "catch up" and learn more content that I'd need to stay motivated. Family time was my reward so it was a great motivator.	organization strategies	learning strategies
Participants 5	Lecturio, pathoma, and sketchy were good for the basics. I wish I'd used it more during the first semester. The OMT Review by Savarese was amazing and extremely helpful for Comlex. I often just used lecture PowerPoints for my main source of information for most exams.	using additional resources	self-regulation of learning
Participants 5	I used sketchy, pathoma, uworld, and combank	using additional resources	self-regulation of learning
Participant 6	balancing time was the hardest for me	purposeful management of time	purposeful management of time
Participant 6	I was just mostly only studying, and then I got tired of only studying, and then I would hang out a little bit more. But then I would just go back to only studying. So I think like more balancing time.	purposeful management of time	purposeful management of time
Participant 6	I make a time, management schedule	purposeful management of time	purposeful management of time
Participant 6	at the beginning of every week, I write out like my to do list of things that I have to do and it works for the most part.	purposeful management of time	purposeful management of time
Participant 6	Sometimes I procrastinate but still get it done like right before it's due. But i'll still do it.	purposeful management of time	purposeful management of time

Participant 6	like what I do is I don't plan enough time and for like relaxation	work-life-balance	work-life-balance
Participant 6	I think I would just add that more to the time management schedule that I usually make, or my to do list, which I've started doing a little bit more this year, because it's not as structured as the Pre-Clinical years, so time can get away from you really easily.	purposeful management of time	purposeful management of time
Participant 6	I used Anki with some of the pre made flash cards. I used some of boards and beyond. Then U-world and the true learn questions.	learning strategies	learning strategies
Participant 6	I think I used USMLE Rx	learning strategies	learning strategies
Participant 6	I guess for me it was helpful when I was in the post bacc year, and we were doing things a lot slower, because I got a chance to give myself a strong groundwork	seeking faculty support	self-regulation of learning
Participant 6	I would go and ask during our office hours. I just asked questions all the time. I would just go in there if I had a quick question	seeking faculty support	self-regulation of learning
Participant 6	Some professor still had the office hours available, so I would optimize that, and like seek any clarification for anything I didn't know, or even just listening to them go over some of the material over again with other students was helpful.	seeking faculty support	self-regulation of learning
Participant 6	I didn't use any strategies to really keep myself motivated while I was in the hospital setting and in the outpatient setting. It was more like realistic	internal motivation	self-regulation of learning
Participant 6	you were actually seeing things	analyzing and applying	learning strategies
Participant 6	I discuss some things with my family like not with like Hipaa, of course, not saying any names or anything like that, but just discussing scenarios that, like we came across and just being done them just being like, oh, I didn't know that. And teaching them certain things is always help is like very motivating for me to, because it helps them with their medical conditions as well.	elaboration strategies	learning strategies

Participant 6	If I didn't have for free time, I would just vocalize it, and then I would wait till I had free time, and I would just dedicate all that time to just doing all the things I may have neglected during the exam week.	work-life-balance	work-life-balance
Participant 6	throughout the week I would make sure I would be doing like some of my like responsibilities, little by little, so that they wouldn't pile up	work-life-balance	work-life-balance
Participant 6	It was a little bit easier because you're basically making your own schedule for the most part	purposeful management of time	purposeful management of time
Participant 6	definitely had to make sacrifices with family time, especially because my family isn't local	work-life-balance	work-life-balance
Participant 6	if I want to see them, I have to fly out	work-life-balance	work-life-balance
Participant 6	and I had to like kind of suck it up and not be able to go if I had an exam,	thoughts and attitudes	self-regulation of learning
Participant 6	even during dedicated I couldn't go, and I just had to like keep in contact and call and use facetime and stuff,	work-life-balance	work-life-balance
Participant 6	It was hard, but I pushed through.	thoughts and attitudes	self-regulation of learning
Participant 6	The second half of the second here I would work out every single morning	self-care	work-life-balance
Participant 6	and that would give me a lot of mental breaks, because I really enjoy listening to different music and knowing what's coming out	self-care	work-life-balance
Participant 6	I would watch my like reality TV shows, and they would always give me mental rest because they were always so. They were the worst, but the best for somebody who's always has their heads in the book	self-care	work-life-balance
Participant 6	taking at least 1 h for yourself every day to just make sure like you are okay and doing something what you like is number one.	prioritizing mental health	work-life-balance
Participant 6	maybe starting some of the premade decks for Anki like in advance and doing it little by little. So then it doesn't pile up as much, even when you're you have a lot of stuff to study for, because as long as it kind of correlates. You'll get some of the stuff you're in ther	learning strategies	learning strategies
Participant 6	starting U-world, maybe buying U-world a little bit earlier and using it during breaks.	learning strategies	learning strategies

Participant 6	there are different resources out there like online med-ed for it, and boards and beyond that you can use to supplement it. But I've just been doing like some of the pre-made Anki decks that we can get online. And then just do questions.	using additional resources	self-regulation of learning
Participant 6	what helped me was the OPP. Like the OMM concepts,	learning strategies	learning strategies
Participant 6	getting them down so like you gave me a lot of time cushion, because sometimes I didn't have to like sit down there and decipher what the question was really asking if I knew, like what the OMM technique was or like what they were referring to organ system wise, so that made it a lot more helpful	analyzing and applying	learning strategies
Participant 6	utilizing that skill	testing strategies	learning strategies
Participant 6	I think, like the other thing was like some of the micro was a little bit like trickier, I guess I would say, because it wasn't like the bread and butter stuff we always see. But, like I learned those really well, and I like memorize them, and it made it a lot easier to go about doing that.	learning strategies	learning strategies
Participant 6	I think it was like mostly the Osteopathic stuff that was most helpful for passing comlex level one, because sometimes it would just refer to a specific like organ system. But it wouldn't say it would just give you like the segments that were there, and then you could kind of deduce which one what? The answer was based off that.	testing strategies	learning strategies
Participant 6	It gave us more of a like basis to learn some of the stuff we didn't get in undergrad. And I would, since it was at a slower pace. It made it like sink in more because we were being like tested a specific type of way.	learning strategies	learning strategies
Participant 6	I think it's just because of and doing a lot of practice problems, you kind of noticed the pattern, too, and that's what was helpful.	testing strategies	learning strategies

Participant 6	I forgot to mention the other strategy for the test that was good was taking the COMSAEs. I'm like taking them like as slowly as possible to try to understand them. Taking it in an untimed situation, so that you can like actually like figure out like what's being asked, because it was very like representative of the actual exam,	testing strategies	learning strategies
Participant 6	On my COMSAE, I think I got like a 488, which was passing, but like then I took it again right before, like another practice one, because I saved one practice one right before, and I was like in the 5 hundred's, and I felt like more comfortable with moving forward to pass it.	testing strategies	learning strategies
Participant 6	Anki Uworld True learn Boards and Beyond First aid	using additional resources	self-regulation of learning
Participant 6	Watching videos from Osmosis to assist then rereading the material.	self-regulation	self-regulation of learning
Participant 6	Rereading the material	self-regulation	self-regulation of learning
Participant 6	Using supplemental information	using additional resources	self-regulation of learning
Participant 6	Flash cards and practice questions	learning strategies	learning strategies
Participant 6	In my pediatrics rotation I met a patient with potential osgood schlatter disease and learning how to identify it assisted me in providing a plan for the pediatrician	analyzing and applying	learning strategies
Participant 6	Creating a checklist on my notion and trying to complete all the tasks.	organization strategies	learning strategies
Participant 6	Lecturio helped with reinforcing some information.	self-regulation	self-regulation of learning
Participant 6	Using sketchy and reinforcing the information from the videos with anki	using additional resources	self-regulation of learning
Participant 6	During medical school I felt there wasn't as much time to ask questions to staff but I would use the question board from time to time.	seeking faculty support	self-regulation of learning

Appendix K

Raw Data Codes, Categories and Themes for Research Question 4

Participants	Raw Data	Categories	Themes
Participant 1	Anki and YouTube videos	learning strategies	Self-regulation of learning
Participant 1	Made Anki cards for everything	learning strategies	Self-regulation of learning
Participant 1	I watched lectures online so I was able to pause/play and I would drink a lot of coffee	regulation of learning	Self-regulation of learning
Participant 1	I YouTube'd videos on the similar topics or ask my friends	peer learning	support from peers
Participant 1	Anki cards	learning strategies	Self-regulation of learning
Participant 1	Just kept going and trying to do as much as I could	self-oriented	Self-regulation of learning
Participant 1	Downloaded Pre-made Anki cards that had relevant information from which to study and books like first aid	regulation of learning	Self-regulation of learning
Participant 1	I did more questions, more Anki cards and had a notebook to write down facts/information from questions I got wrong	regulation of learning	Self-regulation of learning
Participant 1	"I passed everything, but it was like, some of it by was by like the grace of God	internal abilities	Self-regulation of learning
Participant 1	"I get so like depressed"	Depressed	Thoughts and attitudes
Participant 1	"Kinda made me study"	internal motivation	Staying motivated

Participant 1	Could not work study the same way as peers.	regulation of learning	Self-regulation of learning
Participant 1	“I would always get like kind of depressed”	Depressed	Thoughts and attitudes
Participant 1	“I was a little bit better	mental health challenges	Mental health and wellbeing
Participant 1	Although medical knowledge base increased, grades were not reflecting that.	academic challenges	learning challenges
Participant 1	“but it was like it didn't make me feel good that I knew a lot”	depressed	Thoughts and attitudes
Participant 1	“so like I think part of it's just like my testing, and I have like a lot of anxiety when it comes to testing”	testing anxiety	learning challenges
Participant 1	Needs to create an ideal environment before seeing his grades to ease his anxiety.	personal well-being	Mental health and wellbeing
Participant 1	Being on medication sooner may have helped with classes and testing anxiety.	personal well-being	Mental health and wellbeing
Participant 1	“I don't know how it would be if I had started taking Adderall during classes”	professional help	Seeking professional help
Participant 1	Advised to try many different things but they did not work for him	seeking faculty support	Support from faculty

Participant 1	Being on medication helped him to understand concepts clearer.	professional help	Seeking professional help
Participant 1	Sought professional medical help to address his learning challenge.	professional help	Seeking professional help
Participant 1	Sharing the resources with the entire class	working with peers	support from peers
Participant 1	“motivate me”	internal motivation	Staying motivated
Participant 1	Motivation to keep studying.	internal motivation	Staying motivated
Participant 1	Sacrificing time with friends to study.	purposeful management of time	Self-regulation of learning
Participant 1	Repetition	regulation of learning	Self-regulation of learning
Participant 1	Repetition	regulation of learning	Self-regulation of learning
Participant 1	“I need like a lot of time”	learning challenges	learning challenges
Participant 1	“I just need like a lot more time”.	learning challenges	learning challenges
Participant 1	Needs repetition	regulation of learning	Self-regulation of learning
Participant 1	Using Anki flashcards has been the best tool for him that has worked since college. Other methods have not worked.	regulation of learning	Self-regulation of learning
Participant 1	Needs more time to study than most students.	learning challenges	learning challenges
Participant 1	Was appreciated for sharing resources that he created.	working with peers	support from peers
Participant 1	discouragement	depressed	Thoughts and attitudes

Participant 1	His process of watching lectures and making the flashcards	learning strategies	Self-regulation of learning
Participant 1	He needed to start studying right away, while his friend could take a week off.	learning strategies	Self-regulation of learning
Participant 1	“its just hard for me to like learn things”	thoughts and attitudes	thoughts and attitudes
Participant 1	unsure of what he would do differently when it comes to studying.	internal abilities	Self-regulation of learning
Participant 1	metaphor for high level of anxiety.	Anxiety	Thoughts and attitudes
Participant 1	Expressing higher confidence in performance, but still harder to gauge actual performance on exam.	internal abilities	Self-regulation of learning
Participant 1	dwelled on all the questions he realized he did wrong after the exam for weeks.	thoughts and attitudes	thoughts and attitudes
Participant 1	“watching everybody, go to like all over the world like different countries, different states like on vacation”	purposeful management of time	Self-regulation of learning
Participant 1	describing all the events, birthdays, and family trips he missed during the preclinical years due to upcoming exams and	purposeful management of time	Self-regulation of learning

	studying, and board exams.		
Participant 1	“it's always just like ultimately, just like trying to pass. And that's what kind of keeps me motivated”	internal motivation	Staying motivated
Participant 1	“just trying to do as much as I can motivates me”	internal motivation	Staying motivated
Participant 1	advisor kept him accountable and that helped him.	seeking faculty support	Support from faculty
Participant 1	“to keep me accountable”	seeking faculty support	Support from faculty
Participant 1	advising was very general. May help some, but not all.	seeking faculty support	Support from faculty
Participant 1	Spoke with others and realized they waited to take the exam.	working with peers	Support from peers
Participant 1	open about his board failure.	openess about failure	Support from peers
Participant 1	expressing how it feels for him to look at grades.	anxiety	Thoughts and attitudes
Participant 1	expressing how it feels for him to look at grades.	emotions	Thoughts and attitudes
Participant 1	expressing past emotions after his first Comlex failure.	emotions	Thoughts and attitudes
Participant 1	Had a lot going on in his life during the first board exam.	thoughts and attitudes	thoughts and attitudes

Participant 1	Thought he was behind the schedule when speaking with other classmates.	thoughts and attitudes	thoughts and attitudes
Participant 1	expression of a rare combination of adverse meteorological factors.	thoughts and attitudes	thoughts and attitudes
Participant 1	Doing things differently the second time around.	thoughts and attitudes	thoughts and attitudes
Participant 1	So like that year I think I have like. I don't think I had like a vacation, or like any like real break"	purposeful management of time	Self-regulation of learning
Participant 1	Planning for time with family or social events were very difficult.	purposeful management of time	Self-regulation of learning
Participant 1	Shared that he attended parks and did photography to help him mentally unwind.	personal well-being	Mental health and wellbeing
Participant 1	listened to podcasts to relax.	self care	Mental health and wellbeing
Participant 1	Did not have the additional stress or distractions in his life as he did the first time he took the exam.	thoughts and attitudes	thoughts and attitudes
Participant 1	Explains that he studies until he is drained mentally.	exhaustion	Thoughts and attitudes
Participant 1	Being honest with himself and trying his best.	internal abilities	Self-regulation of learning
Participant 1	Understands his limitations.	internal abilities	Self-regulation of learning

Participant 1	“my goal”	goal oriented	Staying motivated
Participant 1	expressing how that made him feel	emotions	Thoughts and attitudes
Participant 1	“Mentally that was probably one of the worst times like when I had to remediate”	personal well-being	Mental health and wellbeing
Participant 1	Describing how it felt when friends were sharing their own experiences while he was behind studying and remediating.	personal well-being	Mental health and wellbeing
Participant 1	But it was like it came to at a cost”.	personal well-being	Mental health and wellbeing
Participant 2	note taking, color coordinating, spaced repetition, verbal review	learning strategies	Self-regulation of learning
Participant 2	outsource to classmates or youtube	working with peers	support from peers
Participant 2	go back to the lectures and review relevant information	elaboration strategies	Self-regulation of learning
Participant 2	youtube, online med ed, peers	using additional resources	Self-regulation of learning
Participant 2	I would often create quizlets or use anki or formulate practice questions to determine how the examiner may ask these questions.	learning strategies	Self-regulation of learning
Participant 2	I was able to diagnose depression multiple times using mneumonics and other methods in class	analyzing and applying	Self-regulation of learning

Participant 2	I used an agenda and made many to do lists	organization strategies	Self-regulation of learning
Participant 2	online medical education, youtube	using additional resources	Self-regulation of learning
Participant 2	Grecia Chami was incredibly helpful and directed me to northwestern tutoring services	seeking faculty support	Support from faculty
Participant 2	the only ones who provided help or guidance were Grecia Chami and Caitlin Arbos. They were very understanding of my situation and provided me with empathy. Grecia was the only one who had my back both times, listened to me cry, and helped prioritize my mental health and healing. She provided resources that were imperative to my success.	seeking faculty support	Support from faculty
Participant 2	the challenge of navigating through Covid during medical school	Covid-19	Covid-19 pandemic
Participant 2	“transitions was really hard”	thoughts and attitudes	thoughts and attitudes
Participant 2	Therapy was a strategy used- Sought professional help	professional help	Seeking professional help
Participant 2	to express how much she relied on	professional help	Seeking professional help

	her support system.		
Participant 2	Described the different tools and resources that she used.	using additional resources	Self-regulation of learning
Participant 2	explaining the online resources that she used.	using additional resources	Self-regulation of learning
Participant 2	incorporating more space repetition when learning.	regulation of learning	Self-regulation of learning
Participant 2	Incorporating more board information when studying early on mid-first year or by second year.	regulation of learning	Self-regulation of learning
Participant 2	testing strategies Needed	learning strategies	Self-regulation of learning
Participant 2	testing skills and strategies needed	learning strategies	Self-regulation of learning
Participant 2	Board exam strategy would have been helpful once rotations experiences began.	learning strategies	Self-regulation of learning
Participant 2	The challenge of preparing for several courses in one exam.	thoughts and attitudes	thoughts and attitudes
Participant 2	Explaining the strategy of writing concepts she didn't understand to go back to in a notebook.	learning strategies	Self-regulation of learning
Participant 2	Encouragement from those shared the same experience would have been helpful.	professional help	Seeking professional help

Participant 2	Validating her performance.	internal motivation	Staying motivated
Participant 2	trying to recall	thoughts and attitudes	thoughts and attitudes
Participant 2	expressed to show that her strategy was working.	internal abilities	Self-regulation of learning
Participant 2	Realizing her error	thoughts and attitudes	thoughts and attitudes
Participant 2	"I have a lot of testing anxiety"	testing anxiety	learning challenges
Participant 2	"I have very severe testing anxiety and it's very hard when no one's guiding you"	testing anxiety	learning challenges
Participant 2	Testing strategies	learning strategies	Self-regulation of learning
Participant 2	sound concepts	critical thinking	Self-regulation of learning
Participant 2	obtained professional tutoring services as required before a 3rd attempt by medical education.	professional help	Seeking professional help
Participant 2	how to dissect the questions.	learning strategies	Self-regulation of learning
Participant 2	describing how useful that resource was for her in understanding how to prepare for the exam.	professional help	Seeking professional help
Participant 2	strategy proved to be successful	learning strategies	Self-regulation of learning
Participant 2	additional resource provided by tutoring program.	professional help	Seeking professional help
Participant 2	Stressing how that resource helped her.	professional help	Seeking professional help
Participant 2	It's very challenging"	thoughts and attitudes	thoughts and attitudes
Participant 2	testing skills and strategies needed	testing strategies	Self-regulation of learning
Participant 2	She always prioritized my	personal well-being	Mental health and wellbeing

	mental health before anything		
Participant 2	it was almost like a Mini therapy session she check in on me”	personal well-being	Mental health and wellbeing
Participant 2	“that's where I thrive in”	internal abilities	Self-regulation of learning
Participant 2	Tutoring for OPP as well.	professional help	Seeking professional help
Participant 2	Support from Clinical Education and options she would have if needed.	seeking faculty support	Support from faculty
Participant 2	Looking forward to clinicals	goal oriented	Staying motivated
Participant 2	expression for practicing medicine rather than the learning of medicine	goal oriented	Staying motivated
Participant 2	Describing the support she received from Medical Education staff.	seeking faculty support	Support from faculty
Participant 2	Close friends were important	peer support	support from peers
Participant 2	Compromises, um my social life, my mental health”	work life balance	Self-regulation of learning
Participant 2	Importance of support system.	professional help	Seeking professional help
Participant 2	“That was maybe not a compromise, but a sacrifice”	work life balance	Self-regulation of learning
Participant 2	working with others was her motivation to get through preclinical years.	goal oriented	Staying motivated
Participant 2	Certain classmates helped and guided her without shaming her	working with peers	support from peers

Participant 2	challenging period in her life.	thoughts and attitudes	thoughts and attitudes
Participant 2	“something I had to learn with time was to prioritize”	work life balance	Self-regulation of learning
Participant 2	So days I wasn't, giving it my best just kind of just being a little bit more kind to myself”	personal well-being	Mental health and wellbeing
Participant 2	“Spending time with my family was a compromise I had to make”	work life balance	Self-regulation of learning
Participant 2	shared challenges with two friends.	peer support	support from peers
Participant 2	motivating each other	peer support	support from peers
Participant 2	Others sharing their experiences openly gave her hope.	peer support	support from peers
Participant 2	The kindness and openness of those who had been through a similar challenge helped her.	peer support	support from peers
Participant 2	Support from her parents was helpful to her.	seeking faculty support	Support from faculty
Participant 2	Expressing how her friends were supportive.	peer support	support from peers
Participant 2	explaining how she was able to spend time with friends in medical school, but not with friends outside of medical school.	work life balance	Self-regulation of learning

Participant 2	spending time with friends which helped her relax and unwind.	personal well-being	Mental health and wellbeing
Participant 2	her mental health is sacrificed during medical school as an expectation.	mental health challenges	Mental health and wellbeing
Participant 2	Expressing that she felt that compromises were normal when in medical school.	personal well-being	Mental health and wellbeing
Participant 2	Struggling in medical school during covid.	Covid-19	Covid-19 pandemic
Participant 2	Med Ed Advisor was very helpful to her.	seeking faculty support	Support from faculty
Participant 2	“It was giving my brain a way to cope with a lot of things, and put my energy towards something really good”	personal well-being	Mental health and wellbeing
Participant 2	“ it was a lot more of just dedicating my energy towards something that wasn't academic school per se”	personal well-being	Mental health and wellbeing
Participant 2	“I think that just really relying on your support system, having a good group of people and having someone like Grecia from the beginning would have been incredibly helpful”	seeking faculty support	Support from faculty

Participant 2	feels that not having enough support from medical school is leading to the number of failures.	seeking faculty support	Support from faculty
Participant 2	“relying on upper classmen was helpful”	peer support	support from peers
Participant 2	Bonding with friends.	work life balance	Self-regulation of learning
Participant 2	Self-care.	self care	Mental health and wellbeing
Participant 2	working on other things outside of medical school gave her mental breaks.	work life balance	Self-regulation of learning
Participant 2	I also do a lot of puzzles. If that is also, like jigsaw like thousand piece puzzles um doing that arts and crafts. Um! I got into gardening for a while as Well, that was a way. Oh, uh-huh! Almost forgot shopping.	self care	Mental health and wellbeing
Participant 2	Activities to bond with friends and family and for mental breaks	work life balance	Self-regulation of learning
Participant 2	Developing and maintaining good relationships during medical school for support.	peer support	support from peers
Participant 2	Board exam strategy would have been helpful once rotations experiences began.	testing strategies	Self-regulation of learning

Participant 2	Sharing her thoughts on the best time to offer the board review	thoughts and attitudes	thoughts and attitudes
Participant 2	"I think if they start integrating one or two board style exams"	learning strategies	Self-regulation of learning
Participant 2	"So teaching those strategies early on in your third year um would have been very helpful."	learning strategies	Self-regulation of learning
Participant 2	Suggesting a support group to help those who are struggling or failed.	peer support	support from peers
Participant 3	-Watch lecture/take notes during lecture -Review anki cards made by friends -Group study	peer learning	support from peers
Participant 3	-Ask others -Use other sources to teach me a different way	peer learning	support from peers
Participant 3	-Watch that part of lecture again at a different time -Confirm with other students my understanding is correct	peer learning	support from peers
Participant 3	-confirm with other students -use other sources to explain topic	using additional resources	Self-regulation of learning
Participant 3	-anki cards -group quizzing	peer learning	support from peers
Participant 3	Medication names were much more familiar in real world settings and easier to remember since I	analyzing and applying	Self-regulation of learning

	had seen them before.		
Participant 3	-Made a schedule for myself -studied with friends -made sure to have breaks/socialize	regulation of learning	Self-regulation of learning
Participant 3	-boards and beyond-osmosis-sketchy-pathoma	using additional resources	Self-regulation of learning
Participant 3	-sketchy -boards boot camp -anki	using additional resources	Self-regulation of learning
Participant 3	I didn't have much contact with staff while studying for my 1st attempt but during my second attempt staff members reached out and checked in every so often to check my progress. They also provided tons of emotional support.	seeking faculty support	Support from faculty
Participant 3	The 2 issues she dealt with that contributed to her struggle.	mental health challenges	Mental health and wellbeing
Participant 3	incorporating what others were doing that helped them	peer support	support from peers
Participant 3	Support and encouragement by others during her struggling period during preclinical years.	peer support	support from peers

Participant 3	prioritizing was important for balance.	work life balance	Self-regulation of learning
Participant 3	Setting boundaries and managing of her time.	purposeful management of time	Self-regulation of learning
Participant 3	expressing the need to change her way of studying for M1 year.	thoughts and attitudes	thoughts and attitudes
Participant 3	But that was probably the worst things I struggled with the most were probably those two things during my first year was getting the grades up, and the second year was the student progress thing.	thoughts and attitudes	thoughts and attitudes
Participant 3	support.	professional help	Seeking professional help
Participant 3	Not feeling that her efforts were rewarding.	thoughts and attitudes	thoughts and attitudes
Participant 3	“My first year- Um, I was used to getting straight As all the time.”	internal abilities	Self-regulation of learning
Participant 3	“because I never use those before”	thoughts and attitudes	thoughts and attitudes
Participant 3	“that was a little tougher”	internal abilities	Self-regulation of learning
Participant 3	“I did this towards the um beginning of my second year which was when I started doing a lot better.	learning strategies	Self-regulation of learning
Participant 3	“my class rank, or whatever skyrocketed um	internal abilities	Self-regulation of learning

	from my first to second year"		
Participant 3	I had never experienced anything like that, and to have it happen right before studying for boards definitely wasn't helpful	thoughts and attitudes	thoughts and attitudes
Participant 3	Manages her time by multitasking. That helps her.	purposeful management of time	Self-regulation of learning
Participant 3	Balanced time for socialization and for studying.	work life balance	Self-regulation of learning
Participant 3	Structured her time balance between school and social time	work life balance	Self-regulation of learning
Participant 3	I did several um types of questions I started with, Amboss, and I did those pretty much daily, but I didn't think I was getting anything out of it. Um! I also did some U-world, but again. What I would do is I would answer them, take what the answers they gave me, try to learn that concept	learning strategies	Self-regulation of learning
Participant 3	Used sketchy resource which was helpful for her.	learning strategies	Self-regulation of learning

Participant 3	She realized that the structure of the bootcamp program because it gave her a checklist to complete regularly.	professional help	Seeking professional help
Participant 3	Explaining the program/resource that she used for the second attempt.	professional help	Seeking professional help
Participant 3	Sharing that she had a friend who went through the program with her.	working with peers	support from peers
Participant 3	Explain that that the motivation and affirmations she needed was not something the Medical Education Staff could give her.	seeking faculty support	Support from faculty
Participant 3	Felt that the program was not very structured but chose it due to cost.	professional help	Seeking professional help
Participant 3	successful without the reassurance of medical staff	internal abilities	Self-regulation of learning
Participant 3	her way of expressing all of the emotions she went through prior to taking the exam the second time	emotions	Thoughts and attitudes
Participant 3	was looking forward to working on getting in the real world.	goal oriented	Staying motivated
Participant 3	“I honestly had a lot of uh praying is the personal thing”	internal motivation	Staying motivated

Participant 3	prayer really helped me a lot to get through it."	thoughts and attitudes	thoughts and attitudes
Participant 3	lot of things I did miss out on my family, but that's not anything that anyone any other medical student isn't experiencing."	work life balance	Self-regulation of learning
Participant 3	"I don't really use a lot of time to like to be "lazy".	purposeful management of time	Self-regulation of learning
Participant 3	"different study strategies for sure'	learning strategies	Self-regulation of learning
Participant 3	"But I would probably incorporate things that made studying more efficient, like Anki and such like that"	learning strategies	Self-regulation of learning
Participant 3	"didn't grasp concepts as a whole"	learning challenges	learning challenges
Participant 3	"but I saw myself getting the same questions wrong over and over"	internal abilities	Self-regulation of learning
Participant 3	"I did use sketchy that was hugely helpful"	regulation of learning	Self-regulation of learning
Participant 3	Did everything she thought she should and she still did not pass.	thoughts and attitudes	thoughts and attitudes
Participant 3	the encouragement to be in the real world was a motivator for her	goal oriented	Staying motivated

Participant 3	Explaining that she prioritized school first before home and other responsibilities	work life balance	Self-regulation of learning
Participant 3	Explaining that compromises did affect her academics.	personal well-being	Mental health and wellbeing
Participant 3	engaging in Self care activities.	self care	Mental health and wellbeing
Participant 3	spending time with her family.	work life balance	Self-regulation of learning
Participant 3	Explaining that as a Student Ambassador she has shared that with incoming students to prioritize their mental health. That they are not robots.	mental health challenges	Mental health and wellbeing
Participant 3	Explaining that everyone has their own steps to follow.	internal abilities	Self-regulation of learning
Participant 3	she is not seeking a competitive specialty, which she believes was easier for her mental health.	personal mental health	Mental health and wellbeing
Participant 3	"Grecia is very helpful."	seeking faculty support	Support from faculty
Participant 3	"It was just as it was very difficult to gauge what "feeling ready" meant.	internal abilities	Self-regulation of learning
Participant 3	"honestly, I'm obviously glad it happened the way it did"	analyzing and applying	Self-regulation of learning

Participant 3	"It was difficult to gauge how I felt. Um, because I thought I was ready the first time. But obviously I was not so. That's why I think it was like confusing."	internal abilities	Self-regulation of learning
Participant 3	"Not a lot of motivation was needed"	goal oriented	Staying motivated
Participant 3	"I didn't want to waste time that I had not studying	purposeful management of time	Self-regulation of learning
Participant 3	"I missed a few family events, but I don't really think it drastically bothered me um personally, because I made sure to make time when I could"	purposeful management of time	Self-regulation of learning
Participant 3	"I think it could have like improved a bit, but maybe not like drastically, so I think my grades took a bit of a toll, but not anything that I think would have been like the night and day situation."	internal abilities	Self-regulation of learning
Participant 3	I have told myself, if I moved out of state to some place by myself. I think my mental health would not have been as good as it was without my family nearby"	personal well-being	Mental health and wellbeing

Participant 3	The biggest thing that I could say is to make a group of friends who you can definitely come to, because no one else will understand the struggles you're going through except the other students who are doing it with you"	peer support	support from peers
Participant 4	I primarily used Anki (self-made cards & notes) to study for exam. This worked very well for all coursework except Endocrinology and Physiology.	using additional resources	Self-regulation of learning
Participant 4	I used additional supplemental resources such as Lecturio (or seldomly Osmosis), YouTube, fellow study partners, Master of Biomedical Science tutors, or as a last option, sometimes I'd ask other classmates outside of my normal study trio.	working with peers	support from peers
Participant 4	I'd ask other classmates if they got the point I had missed. They would show me their notes and explain what they understood from the point.	working with peers	support from peers

Participant 4	Me and a group of my classmates would create Anki flashcards which used a Spaced Repetition Algorithm to help ensure I was only reviewing the information I was not understanding. Sometimes just before an exam, me and my study partners would quiz each other.	working with peers	support from peers
Participant 4	The way the course material was taught in lecture did not help out in a real-world application at all — literally 0%. The only course which really helped was Principles of Clinical Medicine so long as the preceptor instructed well (such as Dr Noel Alonso, who was an amazing teacher).	analyzing and applying	Self-regulation of learning

Participant 4	I had a certain number of lectures to view, Anki cards to make, and then required myself to get through all of that day's lecture's anki cards as well as review all prior lecture cards (if they were due for review according to the spaced repetition algorithm). If I missed a card, I would add some image from either the lecture slides or online images from Google which helped clarify the topic and helped me understand the point better.	regulation of learning	Self-regulation of learning
Participant 4	Sketchy, Pathoma, Lecturio (or sometimes Osmosis), COMQUEST, COMBANK.	using additional resources	Self-regulation of learning
Participant 4	After failing the exam 2 times before, I realized that I needed to give more attention to maintain my mental health and also decided to create my own personalized resource (which I plan on trying to patent). Switching things up in this	personal well-being	Mental health and wellbeing

	manner made all the difference.		
Participant 4	Medical school staff did not help at all during my Pre-Clinical courses (except for Dr Mayi, Dr Dribin, and Dr Alonso). The main people which were helpful were the MBS tutors. In terms of passing the COMLEX Level 1, Dr McCarthy was very helpful in her approach to study design. She helped me break down my goals into a weekly and daily amount which was doable, and because of her clinical background, she understood the complexity of working in clinic during the day and how much could realistically be studied at night. The non-clinical academic counselors just never were understanding of this challenge, and	professional help	Seeking professional help

	were never able to adequately give me useful advise to manage such a situation, which was why after my first failure, I was granted support by Dr McCarthy. I am so happy she worked with me. Mrs Mirela Burca was not helpful in developing a study plan.		
Participant 4	Describing the process that he used along with 2 colleagues to study by sharing the load and creating Anki flashcards.	working with peers	support from peers
Participant 4	decided to share and distribute the flashcards to the entire class.	working with peers	support from peers
Participant 4	expressing the impact that the SPC phone call had on him	mental health challenges	Mental health and wellbeing

Participant 4	explaining that what students are told about going to student progress and how it really is made to believe that is will destroy their chances of matching for residency.	mental health challenges	Mental health and wellbeing
Participant 4	expressing his poor performance on the exams during that period of time.	academic challenges	learning challenges
Participant 4	“It was really hard to focus.”	regulation of learning	Self-regulation of learning
Participant 4	“I just bombed because of how much mental stress I had around this topic	menal well-being	Mental health and wellbeing
Participant 4	to study for my shelf exams for my rotations and study for the level one I was like-I need to push this all the way to the end as much as possible. So I pushed it. I pushed it as much as I could”	goal oriented	Staying motivated
Participant 4	weighing his options of either preparing for SPC and potentially failing the exams or preparing for exams and potentially getting	decision making process	Self-regulation of learning

	kicked out of medical school.		
Participant 4	had to study at home due to covid, and that was challenging with 3 kids and a wife	Covid-19	Covid-19 pandemic
Participant 4	asking for help from his peer.	peer support	support from peers
Participant 4	Accepting the truth	thoughts and attitudes	thoughts and attitudes
Participant 4	Thinking things through	decision making process	Self-regulation of learning
Participant 4	"I went and had to study for my boards while I was doing my rotations, and to get good recommendations, I mean, I was having to work all the time I'd come home from clinic and from the hospital, and I then have to go back to studying all the time"	purposeful management of time	Self-regulation of learning
Participant 4	"the thing I did to balance the challenges, Uh, when I was facing the accusation with student progress, I mean, I really stepped	peer support	support from peers

	into my fellow classmates that I was accused with."		
Participant 4	"we would cry and give each other hugs and kind of pep talks uh while we are going through the process, and really, like my classmates, even before that point, my classmates were some of the biggest support system, and we're really like we would pull together so much, and really help each out"	peer support	support from peers
Participant 4	"Covid was another thing that kind of threw things off because it was at the end of my M2 year that it started	Covid-19	Covid-19 pandemic
Participant 4	"Things that were most successful I think was picking specific stopping points, I mean, all the ones I mentioned, all of them I felt really helped me be successful as much as I was successful."	regulation of learning	Self-regulation of learning

Participant 4	“Every single weekend we would be doing something together”	work life balance	Self-regulation of learning
Participant 4	“Now, I've really developed a lot more, my emotional intelligence and mindfulness. So I’m much more aware of where I’m at in terms of like burnout level, and how much I’m pushing myself.”	personal well-being	Mental health and wellbeing
Participant 4	“And now I know myself a lot better, too”	personal well-being	Mental health and wellbeing
Participant 4	So now I know like, Oh, I’m going to go to the beach, and i'm going to go skimboarding because it's something I really love doing. It gets me active, and it gets me out outdoors. Gets me forgetting about anything related to whatever stressing me at the time. So I’m much more aware of myself, and that's what I would do is those different activities	personal well-being	Mental health and wellbeing

	that really give me that energy back and let me feel recharged."		
Participant 4	"I process things more slowly. I don't have any diagnostic conditions, but I part process things way slow."	internal abilities	Self-regulation of learning
Participant 4	"so I pushed to get through all the questions"	regulation of learning	Self-regulation of learning
Participant 4	Explaining how most students could review 40 questions per day very quickly, but for him it was very difficult	learning challenges	learning challenges
Participant 4	going over the resources and the prep he did for the second attempt.	using additional resources	Self-regulation of learning

Participant 4	Explaining how he reached out to his friend who performed well on the COMLEX for help.	peer support	support from peers
Participant 4	going over the advice his friend gave him and how to study.	peer support	support from peers
Participant 4	Advice given by my peer on how to study and the resources he needed to use.	peer support	support from peers
Participant 4	explaining what resources he used for his 3rd attempt at the Comlex.	using additional resources	Self-regulation of learning
Participant 4	Stressing the strategy that worked for him.	learning strategies	Self-regulation of learning
Participant 4	"I decided that, I needed some sort of aid to help me recall."	learning strategies	Self-regulation of learning
Participant 4	I tried his attempt at first, and just like, think through what I was learning through the question Banks. But I noticed I would forget the information fairly quickly, because I was covering so much."	internal abilities	Self-regulation of learning
Participant 4	"I took a medical leave of absence shortly after	prioritizing mental health	Mental health and wellbeing

	failing the second time."		
Participant 4	So to manage having a family medical school is extremely challenging financially here in Florida."	work life balance	Self-regulation of learning
Participant 4	developed a mind map and how the different locations on campus helps him with recall and diagnosing patients based on their complaints.	learning strategies	Self-regulation of learning
Participant 4	realized that there was more that was affecting his test taking performance.	mental health challenges	Mental health and wellbeing
Participant 4	LOA gave him the time to reassess himself, his goals, and dig deeper regarding his issues and challenge he was experiencing.	professional help	Seeking professional help
Participant 4	seeking help and advice.	professional help	Seeking professional help
Participant 4	asking for mental health break after a classmates committed suicide.	professional help	Seeking professional help
Participant 4	Sharing his personal experience on suicidal ideation while on a	mental health challenges	Mental health and wellbeing

	psychiatric rotation.		
Participant 4	realizing that the patient was experiencing similar thoughts that he was.	mental health challenges	Mental health and wellbeing
Participant 4	realizing that he needed to take control of his mental health before doing anything he would regret.	mental health challenges	Mental health and wellbeing
Participant 4	approved for a mental health break.	professional help	Seeking professional help
Participant 4	"So that was additional stress"	stress	Mental health and wellbeing
Participant 4	"I needed a resource that like really helped me recall it. I actually developed one that I plan on trying to get patented"	learning strategies	Self-regulation of learning
Participant 4	"So that was another thing that I really changed a lot is, I developed completely an entire mind to map for all the conditions."	learning strategies	Self-regulation of learning
Participant 4	And That was that was three months worth of hardcore study and going to rotations.	regulation of learning	Self-regulation of learning

Participant 4	“I am capable of doing this test. But there's something that I’m not addressing that needs to be addressed.”	thoughts and attitudes	thoughts and attitudes
Participant 4	Requested for a medical leave of absence to take care of mental health and attend marriage counseling.	professional help	Seeking professional help
Participant 4	“So that whole time it ended up turning from two months into eight months”	personal well-being	Mental health and wellbeing
Participant 4	“I was in extensive therapy, and it helped out immensely for me to figure out.”	professional help	Seeking professional help
Participant 4	“You know what this mind map approach. This really works for me.”	learning strategies	Self-regulation of learning
Participant 4	Explained that he takes advice from an upper classmen in medical school who has 4 kids and understands what he is going through.	peer learning	support from peers
Participant 4	Advise that another medical student gave him before he started.	peer learning	support from peers
Participant 4	Strategy that he used prior to covid to balance school and	Covid-19	Covid-19 pandemic

	home/family responsibilities.		
Participant 4	Sleep deprivation was a compromise	sleep deprivation	Mental health and wellbeing
Participant 4	Sharing the strategies that he used to balance family and school which helped him with his kids and his wife.	work life balance	Self-regulation of learning
Participant 4	sharing that he wrote an article in the COM Outlook.	work life balance	Self-regulation of learning
Participant 4	Describing the strategy that he used during covid to balance family time, studying, and sleeping by studying at night and sleeping in the day.	Covid-19	Covid-19 pandemic
Participant 4	Changing his sleep pattern helped him prepare for clinical years and working overnight	work life balance	Self-regulation of learning
Participant 4	“It's not also just relying on my sheer grip power of memory and recall.”	learning strategies	Self-regulation of learning
Participant 4	“I think the big support was me reaching out to Dr. Wallace-Ross	seeking faculty support	Support from faculty

Participant 4	“ you can see I’m very happy very smiley. That was not the case back then.”	emotions	Thoughts and attitudes
Participant 4	“Dr. Alonso, he was there for me. I broke down, crying with him one time, after being accused of the unprofessional conduct. I went to him, and he really sat there and was really empathetic. So he's really good.”	seeking faculty support	Support from faculty
Participant 4	Describing what he did during preclinical years to improve mental health	personal well-being	Mental health and wellbeing
Participant 4	another strategy to balance family time and school.	work life balance	Self-regulation of learning
Participant 4	Talking things through with peers and most importantly trusting in your decisions.	peer support	support from peers
Participant 4	“going to Clinic was kind of the motivation in and of itself, because studying in books is not as fun as talking to people and actually seeing it in person.”	goal oriented	Staying motivated

Participant 4	“for me it was such a relief to be in clinics, and just to be seeing the patients and understanding the pathologies”	goal oriented	Staying motivated
Participant 4	he was really instrumental in helping me get perspective on how to manage that on from a Nova level”	seeking faculty support	Support from faculty
Participant 4	”you got to establish clear limits for yourself, know what's needed to be successful, but and only give it that much. Don't give it too much.”	thoughts and attitudes	thoughts and attitudes