

STAYING ON AN ACADEMIC PLAN: IS IT REALLY THAT NECESSARY FOR GAINING
ACCEPTANCE INTO SELECTIVE ADMISSION PROGRAMS

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MASTER OF SCIENCE

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ABSTRACT

This study examined the frequency with which the typical pre-professional pharmacy student alters his/her academic plan, and ultimately affects the student's matriculation into the professional program. The empirical relationship between adherence to an initial academic plan and acceptance into the professional program was assessed using a sample population of students at NDSU who declared a pre-pharmacy major between 2009 – 2014. Chi-square test and Fisher exact test were used to assess this relationship. The results identified 15 classes that would be detrimental to matriculation. One class was found to be detrimental to matriculation if the student withdrew from that class. While many pre-pharmacy classes do not appear problematic, there are several classes that are detrimental to or even halt a student's matriculation into the pharmacy professional program. Academic advisors and other college personnel are encouraged to account for these classes when assisting students in the development of their academic plans.

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DEDICATION

This thesis is dedicated to the 3 people in my life who make me a better person: Dan, Makenna, and Jax. Without you my life would be very bland. I would probably have flatter abs and sleep more but a life without rainbow waffles, hunting for the Cat-asaraus Rex, and the steady stream of coffee, laughter, and warmth is something I never want to be without. I love all of you!

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CHAPTER 1. INTRODUCTION

In an era of economic uncertainty, students are graduating high school with the view that the purpose of education is to acquire specific skills that translate directly to employment. As a result, students pursue specific majors that emphasize vocational skills and provide well-paying employment after graduation. Health related majors are a prime example. The healthcare industry is projected to add more jobs—over 4 million—than any other industry between 2012 and 2022, according to the U.S. Bureau of Labor Statistics (Bureau of Labor Statistics, 2014). As the demand for healthcare providers continues to skyrocket, higher education institutions are tasked with expanding educational opportunities to pursue clinical careers. A large part of developing and training clinicians is ensuring that only those students who have built the academic and “soft skills” necessary to be successful actually matriculate through the program. To ensure appropriate balance between these factors many healthcare training programs utilize competitive admission processes. Students are responsible for successfully establishing themselves in their academic career to gain admission to their respective program. Helping students negotiate the selective admission process largely falls on the shoulders of the academic advisors, that is, if a student chooses to utilize that resource available to them. Unfortunately, it has also been found that college students under-utilize academic support services (Friedlander, 1980), especially those students who are in most need of support (Abrams & Jernigan, 1984; Knapp & Karabenick, 1988).

The student’s best resource for staying on top of their academic trajectory is the academic advisor for their specific major. Academic advisors value and are dedicated to excellence in all dimensions of student success. They motivate, encourage, and support students and the greater

educational community to recognize their potential, meet challenges, and respect individuality (NACADA, 2017). Advisors understand the formal and informal requirements for their program. They stay abreast of the latest trends, changes, and happenings within their major and any exams or procedures involved in the admission of students into the program. Pre-professional program curricula tend to be highly prescribed, due to the vocational nature of the programs. Few disciplines have application requirements that exceed the demanding process of qualifying for admission to a healthcare program.

Effective Academic Advising

Effective academic advising is a time and resource intensive process that facilitates student development. It is therefore significant for students and the academic institutions they attend. According to Chickering (1969), college students develop competence, learn to manage their emotions, move toward independence, develop mature interpersonal relationships, establish identity, develop purpose, and integrity in the process of becoming educated adults. The work that is expected of students along with the situations and the influential people they encounter during the academic journey are influential factors in students' development. Academic advising is an essential element of this growth. Drake (2011) stated that advisors guide students to negotiate the higher education maze, to make effective and thoughtful decisions about their futures, to adapt their life skills to their new academic world and to cultivate the academic skills and knowledge needed to succeed. Increasing student-faculty contact, encouraging active learning, exchanging prompt feedback and emphasizing time on task are some of the good practices of undergraduate education (Chickering & Gamson, 1987) that could be fostered through good academic advising.

Advisors help students create a vision and a workable plan to assist in reaching their future goals (Markus & Nurius, 1986). By capitalizing on the benefits of quality advising, colleges can more effectively help students select the programs and courses that will help them stay in school and on track toward achievement of their education and career goals (ACT 2004 Annual Report, 2004). In pre-professional healthcare majors, healthcare professionals have created their curriculum in a structural way for a specific reason. It's designed to build a foundation of knowledge, skills, and abilities that will ultimately prepare the student for the curricular structure, rigor, and professional expectations of the pharmacy training program (training includes clinical, management, public health, and many additional areas) they intend to pursue. The primary role of advising in selective admission programs is to emphasize the importance of academic career planning; to act as a resource as the student navigates their academic career. A central challenge for advising and advisors is that students do not always follow their academic plans, nor do they cultivate non-academic skills or expand their abilities required by the admission process. As a result, this can lead to delays in their application to the professional program of their choice. In the worst-case scenario, it can lead to the student becoming permanently ineligible for admission to the clinical program.

Colleges of pharmacy do not stipulate a standard set of pre-pharmacy requirements: prospective applicants must determine the pharmacy prerequisite course requirements at the schools where they plan to make application (Elam, Seaver, Berres, and Brandt, 2002). Consider as an example, the Doctor of Pharmacy Program at North Dakota State University. The course sequence in pre-pharmacy often leaves little margin for error, and the course sequence can be inflexible. Because many pre-professional programs require a higher grade point average for admission than other departments within NDSU require for a bachelor's degree, pharmacy

students often exhibit competitive behavior and tendencies. As a result, pre-pharmacy students who seek to enhance their chances of admission tend to visit their advisor more frequently than non-pharmacy students in order to ensure they are maintaining the correct academic trajectory. Factors such as these affect the development and structure of the relationship between pre-pharmacy advisors and their advisees.

When Plans Change

Pre-pharmacy students are provided with a curriculum guide when they register for classes at freshmen or transfer student orientation prior to their start at NDSU. This guide has the classes arranged in each semester based on the pharmacy requirements along with class prerequisites and logical class progression. At orientation and registration, all students are strongly encouraged to meet with their advisor once the semester begins to formulate an academic plan. This plan is used to guide the individual student based on the classes they have already taken and still need to take. Each academic plan is specific to that individual student. Often times, students deviate from their academic plan when they underestimate their class rigor, work too many hours while attending college full time, have personal issues arise such as family problems or fall ill during the semester. According to EAB (2017), the root cause of declining grades indicates a deeper issue in the student's life such as seen in Table 2. Students who are undecided on their major may also choose to deviate from their academic plan to explore other courses before committing to their major.

What's Behind Declining Grades?



Grades Often Just an Indication of Deeper Issues in a Student's Life

Root Causes Differ for Each Student, But With Similar Outcomes



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Source: EAB interviews and analysis.

Figure 1. EAB Declining Grades Theory. Root causes of declining grades often indicates a deeper issue in a student's life. The root cause is different with each student however the outcomes tend to be similar. Adapted from *Breaking through the student communication barrier* by EAB, 2017 Copyright 2017 by EAB.

Student academic stress is reduced and controlled through effective time management and study techniques (Brown, 1991). By changing the plan of study, a student often feels more pressure to speed up their academic progress to make up for the deviation. The feeling of trying to “catch up” tends to apply an enormous amount of stress to the pre-pharmacy students. They try to take more classes than recommended or take a summer class when they are not prepared to devote the resources necessary to be successful. This additional pressure on the student often caused by their feeling of “falling behind” can lead to more deviation from the original academic plan due to unsatisfactory performances in their classes.

This leads to even more setbacks. Any deviation may result in the student having to wait another semester or year before the class is offered again or before they can move onto other classes if the missed class is a pre-requisite for those courses.

As the student moves forward with their academic plan, the class content and course rigor increases. If a student does not start out strong, especially in the required chemistry courses, performance in the subsequent courses also suffer. For example, at NDSU the chemistry courses are sequential... if the student does not acquire a strong knowledge base from General Chemistry I (CHEM121) which covers matter, measurement, atoms, ions, molecules, reactions, chemical calculations, thermochemistry, bonding, molecular geometry, periodicity, and gases, they will struggle in the subsequent courses such as General Chemistry II (CHEM122) which continues on to cover the second half of the textbook including intermolecular forces, liquids, solids, kinetics, equilibria, acids and bases, solution chemistry, precipitation, thermodynamics, and electrochemistry. Organic Chemistry I and II is set up similar to General Chemistry I and II; it builds on to the knowledge acquired from General Chemistry I and II. According to Prof. Jasperse's syllabi (Jasperse, 2017) Organic Chemistry I covers the first half of the textbook which includes nomenclature, structure, properties, and the synthesis, reactions, and reaction mechanisms of alkanes, alkyl halides, alkenes, aromatics, and conjugated systems. Organic Chemistry II covers the second half of the textbook including nomenclature, structure, properties, and the synthesis, reactions, and reaction mechanisms of organometallics, alcohols, aldehydes, ketones, amines, carboxylic acids, and carboxylic acid derivatives.

Biochemistry I and II is again similar to General Chemistry I and II and Organic Chemistry I and II requiring the successful completion of Organic Chemistry II to register for Biochemistry I. When a student struggles in their foundational classes and does not take the time to repeat the class (not only for a better grade but more importantly for a stronger knowledge base) before moving forward, it often does more damage than good.

This is also true for students taking Applied Calculus and General Physics I. Applied Calculus covers limits, derivatives, integrals, exponential and logarithmic functions and applications. General Physics I covers basic principles of bodies at rest and in motion, fluids, vibrations, waves, sound and thermodynamics. When a student struggles with math (college algebra or applied calculus), they tend to struggle with physics due to the struggle with anything math and numbers related.

Statement of the Problem

In order to establish the appropriate academic trajectory right away, first year pre-professional pharmacy students at North Dakota State University are required to meet with their academic advisor to formulate an academic plan as a part of their PHRM 189 (Skills for Academic Success) course. The academic plan is designed to help the student establish the course sequencing required for eligibility to apply to the Doctor of Pharmacy program. It is also designed to guide the student through the sequence of classes in the most successful manner possible. Like all plans, a student's academic plan is not "set in stone". Rather, it is designed to act as a guide to ensure that the student has all of the necessary classes (and taken in the correct order) along with the other requirements (PCAT, work experience, soft skills) to apply to the professional program.

The professional pharmacy program at NDSU can be a daunting goal for many students. No student is guaranteed admission into the program, yet eligibility for admission requires the

completion of 2 – 3 years of pre-professional basic science coursework. In accordance with the NDSU Pharmacy Handbook (Pharmacy Handbook 2016-2017), students are only allowed to apply to the professional program twice. This applies additional pressure on the students to perform at a top level. The professional program has high expectations for their students as evident through the rigorous admission process, required curriculum, high credit load, and the program standards that are required of all professional program students. If students do not meet these expectations, they do not achieve admission. Unfortunately every semester there are students who do not achieve the required expectations or are unable to maintain their projected academic trajectory. The reason(s) for the deviation is unclear at this time.

Purpose of the Study

This study provides the opportunity to determine whether the frequency with which a pre-professional pharmacy student alters their academic plan ultimately affects (or is associated with) whether a student is (and how long it takes to be) accepted into the professional pharmacy program. We will assess the relationship between adherence to an initial academic plan and acceptance into the professional program. If a relationship exists, we will further assess the relationship between the number of changes in the academic plan, what specific changes are made (what classes), and the length of time to be accepted into the pharmacy professional program.

Research Questions

1. What classes tend to cause pre-pharmacy students to change their academic plan of study?
2. What effect does the change in plan of study have on getting into a selective admission professional program?

Significance of the Study

A search of the literature yielded very little evidence to address this issue. This gap in scholarship is significant; although the relationship between pharmacy students and their academic plans have characteristics in common with all college students' relationships with their academic plans, there are several important differences, and these differences may have relevance to pharmacy students. This data will help solidify the information that academic advisors provide to their students regarding the importance of staying on course.

CHAPTER 2. LITERATURE REVIEW

Many students enter college with the dream of becoming a pharmacist. Careers in pharmacy offer a variety of options to students. Whether they are interested in pursuing their career as a community pharmacist, hospital pharmacist, pharmaceutical scientist, consultant pharmacist, administrative pharmacist, or a specialty pharmacist in a hospital; pharmacy offers a plethora of options based on how involved in direct patient care one wants to be, and in what setting they choose to practice. Health professions, including pharmacy, are unique among entry-level college degree programs in that many of these programs not only have pre-professional admission requirements but also (in order to ensure adequate clinical training sites can be provided) competitive admissions processes (Haugen, Davis, & Friesner, 2015). Within pre-professional health programs, one measure of academic success is successful admission to the professional program of the student's choosing. Appropriate and accurate academic advising for these pre-professional students is crucial. The "quality" of academic advising is generally characterized by two primary constructs: student satisfaction and student responsibility (Light, 2001; Metzger, 1989). The second construct, student responsibility, characterizes the degree to which students implement the guidance provided by their academic advisor, and by extension place themselves on a path that leads to academic success. Hemwall and Trachte (2003) suggested that viewing advising as a learning process allows assessment of specific outcomes that can be linked to student achievement. Thus, investigating the relationship between advising and student achievement can reveal how advising helps students develop the skills and knowledge necessary for success (Young-Jones, Burt, Dixon, & Hawthorne, 2013).

Academic advisement throughout a program with a consistent advisor and providing student counseling services demonstrates the organization's commitment to student progress (Courage & Godbey, 1992). The advisor and instructor can work together to monitor student progress and alert the student if they are not being successful in meeting objectives and recommending learning resources to improve performance. Sherrod and Harrison (1994) described a comprehensive advisement program designed to help prevent academic failure and retain students in a nursing program. There were two advising options. One option was once per semester advising which was recommended for all students. The other option was monthly advising which was mandated for those whose GPA was below 2.0 on a 4-point scale. The researchers concluded that the advisement program was effective in increasing student awareness and use of campus support services and faculty reported that the program helped them assist students to identify problems that might affect their completion of the program and retain the students (Sherrod & Harrison, 1994). According to Hadenfeldt (2012), there were fewer student failures and fewer involuntary withdrawals during the years with the intervention. Performance improvement plans were an effective instructional strategy and the faculty were able to offer functional support by reviewing instructor-recommended resources with the student and assisting the student to develop and commit to a plan of action. Assisting students to develop action plans to improve study habits as early as possible during their college careers may lead to success on the first attempt of taking the course which would reap academic, financial, and emotional benefits for students and success upon entry into the program.

This was similar to the findings of the comprehensive advisement program study that Sherrod and Harrison (1994) conducted to determine if multiple advising sessions would help student achieve success and be retained. They concluded that the program was effective in increasing student awareness and use of campus support services and faculty found the sessions helpful to identify problems that the student was experiencing and assist them in developing a plan for improvement.

While many colleges of pharmacy interview students as part of their admission's requirement, most schools require each student to achieve a minimum pre-pharmacy GPA and PCAT score to be considered for an interview (Chisholm, Cobb, DiPiro, & Lauthenschlager, 1999), placing high importance on quality academic advising. NDSU does not have a minimum PCAT score however according to NDSU's Handbook (2016) a cumulative grade point average of 3.0 (4.0=A) or above is required before an applicant will be evaluated for admission to the Professional Entry Level Pharm. D. Program. The actual admission "cut off" is generally much higher than a 3.0.

The courses that pre-pharmacy students are required to successfully complete in the curriculum are designed to provide the student with the knowledge base that they need to be successful in the professional pharmacy program. There have been numerous studies that have attempted to identify factors that predict the performance of pharmacy students. Kimberlin, Hadsall, Gourley, and Benedict (1983) considered various academic and personality variables to predict performance in clinical and basic science coursework and found that the pre-pharmacy grade point average (GPA) was the best predictor of success in the professional program. Houglum, Aparasu, and Delfinis (2005) suggested that the best variables for predicting failure in a pharmacy program included the American College Test (ACT) and the typical student's organic chemistry grade. Sansgiry, Bhosle, and Sail (2006) reviewed test competency compared

to a GPA greater than 3.0 as a predictor. Lobb, Wilkin, McCaffrey, Wilson, and Bentley (2006) studied predictors of first semester and first-year performance but found none more useful than the overall pre-pharmacy GPA and Pharmacy College Admissions Test (PCAT). Studies by Chisholm, Cobb, and Kotzan (1995) and later by Renzi, Krzeminski, and Sauberan (2007) both looked at predictors of first-year performance by pharmacy students and found math and science pre-pharmacy GPA as well as a previous four-year college degree useful. While several studies have attempted to predict academic success, Schauner, Hardinger, Graham, and Garavalia (2013) suggest that academic progression committees should focus on early program coursework when trying to optimize retention.

Predictors of academic success within pharmacy degree programs have included pre-pharmacy GPA and pre-pharmacy math/science GPA, PCAT composite and PCAT subcategory scores, and achievement of a 4-year college degree. In contrast, some studies do not consider GPA as predictive (Chisholm et al, 2013; Lowenthal, 1981). Some studies suggest use of the PCAT subcategory scores over the PCAT composite score, and 1 study opposed the 4-year degree achievement as a predictor of success in pharmacy school. According to Schauner et al. (2013) students tend to struggle early in the pharmacy curriculum in basic science courses such as cellular biology, biochemistry, and physiology. Predictors of poor course grades may vary for degree programs depending upon students' entry points into the program. Poor grade attainment in the provisional PharmD degree pathway was associated with cumulative and science/math GPA, PCAT-quantitative analysis and PCAT-chemistry sub- scores, and English and composite ACT scores. For traditional pathway students, poor grade attainment was associated with cumulative and science/math GPA, cumulative pre-pharmacy course credit hours, the interview score, and all PCAT sub scores on early program coursework when designing strategies to optimize retention.

A student by Newton, Smith, and Moore (2007) of admissions policies in a baccalaureate nursing program found that policies greatly impacted the quality of the students admitted and the achievement of success in the program. Admitting students who had met minimum requirements for admission to programs rather than a more selective approach who were ranked by an admission committee found that students who had met minimum requirements were less likely to achieve success in coursework. The researchers concluded that to achieve the best program outcomes, the highest quality students should be admitted through a selective admission process (Newton, Smith, & Moore, 2007).

Repeating Courses

The pressure to earn good grades and to earn a degree is very high (Hirsch and Ellis, 1964). Earning high, competitive grades is not the only source of stress for college students. Other potential sources of stress include excessive homework, unclear assignments, and uncomfortable classrooms (Kohn & Frazer, 1986). In addition to academic requirements, relations with faculty members and time pressures may also be sources of stress (Sgan-Cohen & Lowental, 1988). Relationships with family and friends, eating and sleeping habits, and loneliness may affect some students adversely (Wright, 1967).

Learning disabilities can also hamper a student's progress in higher education. Learning disorders are manifested in a person with average to above-average intellectual abilities (Kolanko, 2003). Approximately 32 percent of all individuals with a learning disorder also have a co-existing attention deficit disorder/hyperactivity disorder. According to Kolanko (2003), to be a nursing student with a learning disability means to struggle. Nursing students with learning disorders believe that they work harder than their peers without learning disorders, but their hard work yields less positive outcomes. Students reported struggling to stay in the nursing education program. Most felt that they were frequently in danger of dismissal. Particular problem areas

included sciences, mathematics, and nursing courses. The tight program sequencing left little room for students to schedule a difficult course in the same semester with somewhat less challenging courses.

Test performance has become increasingly important as the basis for entry or advancement in education (Spielberger & Vagg, 1995; Zeidner, 1998). Increased usage of test scores to evaluate educational attainments and programs, along with public pressure for higher levels of academic achievement, has created a more pressure-laden atmosphere in university systems (Cizek & Burg, 2006). Testing, therefore, is often a great source of stress and anxiety, and has led to the phenomenon of test anxiety. Whitaker, Lowe, and Lee (2007) estimated test anxiety prevalence at 33 percent in the United States. Zeidner (1998) indicated that test anxiety, because of its debilitating effects, could hinder students' ability to truly demonstrate knowledge and skill, despite actual ability, thus denying them success in higher education.

A study from South Dakota State University by Hansen, Mort, Brandenburger, and Lempola (2015), found the number of courses a student repeated did not carry nearly as much importance as whether the student repeated even a single course. These results suggest programs should not overemphasize multiple repeats. The results also highlight the fact that students typically repeated a course to improve a grade, not simply correct a failing grade and, therefore, the repeat did not represent a failure of the student to achieve a minimum level of understanding on first attempt, which alone would bode poorly for success in the program. Other considerations for repeating a course would include the variations in academic rigor among institutions educating pre-pharmacy students (4 year institution versus a 2 year college), the cause of a student's need to repeat a course (personal matters, credit work load too high), and the year the repeat took place (first year freshmen not adjusting to freedom well versus sophomore living off of campus with inappropriate roommates).

Transfer and Non-traditional Students

Transfer and non-traditional students have the challenge of attending a new institution (or going back to college after some time away) plus navigating a rigid curriculum for a selective admission program. Initial efforts by the receiving institution to orient transfer students are typically limited to a one-day orientation, which not all students attend, and there is little or no effort to provide other assistance in making the initial transition (Jacobs, Bushy, & Leath, 1992). Students need more than a campus map and curriculum guide to be successful at a university much less in a selective admission program. These students can also be faced with the difficulty of transferring their previous courses into the new institution. Not all classes transfer equally from institution to institution nor do they contain the same course content. When taking a sequenced course, (i.e. organic chemistry I and organic chemistry II) the second half of the class will not line up with the first half content taken at a different institution. This gap in knowledge will be the student's responsibility to fill in as best as they can as quickly as they are able to. It is also the student's responsibility to meet with their academic advisor for academic career planning and guidance.

At large receiving institutions, transfer students often feel anonymous and have difficulty in making social connections with fellow students, as well as academic connections with faculty (Britt & Hirt, 1999; Harbin, 1997; Vaala, 1988). In their study, Townsend and Wilson (2006) found nontraditional-age transfer students, finding few like themselves, perceived the lack of older undergraduates as affecting their ability to make social connections. Some of the traditional-age transfer students also had difficulty establishing new friendships because they were entering a community where many friendships that been established during the first year, partly through the university's formal efforts to integrate first-year students into the institution

through such activities as residential learning communities and freshman interest groups. Transfer students are more likely to be neglected or ignored in retention efforts (Berger & Makaney, 2003).

At NDSU, the pharmacy program only use courses that have been successfully completed in the last 7 years. Anything older than that needs to be retaken or current competency needs to be proven. This alone can halt a transfer or non-traditional student's progress by making them go back to prove their knowledge base. While it is absolutely beneficial for the student to do this, especially before they take the PCAT exam, it can hinder the speed of their progress which affects them in many ways (especially financially). Any delay in progression can also deter non-traditional students from a selective admission program.

Back-up Plans

According to the University of Minnesota (2017), each year, thousands of individuals apply to health professional programs. Most of these programs are highly competitive and not all qualified or strong applicants will get in. Thus, it is in the student's best interest to have an equally exciting "Plan B" to consider. If they are not admitted to the health professional program of their choice, feelings of grief, disappointment, and even rejection are perfectly normal. If the student is in this situation, it is important that they understand that the situation, while very disappointing, need not be the end of their career journey. Richardson (2013) explains regardless of a student's academic performance, at least considering a back-up plan is sensible. Advisors should remind the student that a back-up plan is necessary for a variety of reasons, and even for those who might feel certain of their admission into a professional program. Developing a back-up plan or "Plan B" also gives students a sense of peace instead of panic if they do not gain

admission into their program of choice on the first application cycle. It is their academic security net. During the back-up plan, students need to make any changes necessary (i.e. fix grades and/or obtain professional experience) to increase their application strength, along with working towards expanding their application and/or major options. The back-up plan will help guide them to be a stronger candidate as they wait to reapply the following year or move onto a new program/major.

Cost of Deviation

Students may come to college with unclear goals or head into a program of study to discover that the program is not the right one for them (Jeffreys, 2004). Students may discover that the demand and rigors of the program are not compatible with their family and work responsibilities and may be forced to defer or abandon their educational goals. Or students may discover that their expectations of the educational program are mistaken and that the role and skills required of nurses (or healthcare providers) are not of interest to them and choose to switch to a different field of study (Jeffreys, 2004). Involuntary withdrawal may occur when students experience academic failure in coursework requiring students to repeat coursework causing an interruption of program progression or, in the case of several failures, the student may be academically dismissed from the program (Jeffreys, 2004).

The cost of losing or delaying student's progression is substantial in not only the accumulated cost of academic loans for candidates who fail to progress appropriately but the lack of positive momentum in their academic career. Every additional year a bachelor's degree-seeking student spends in college costs an average of \$68,153 in additional tuition, fees, and living expenses, plus forgone income, Complete College America (2014) estimates. Along with

financial burdens, once a student has deviated from their academic plan, often the upper level science classes are only offered one time a year. For example, if the student does not successfully complete General Microbiology (MICR350) during the fall semester, they must wait until the following year to retake that class. This is also the case for Biochemistry I and II (BIOC460 and 461). Occasionally the course may be offered in the “off semester” as an online course. Most students (and admission committees) do not look favorably at science classes offered and taken online (such as Organic Chemistry, Anatomy and Physiology). According to Adams (2009), a more recent area of research has sought to establish the credibility of online degrees from the perspective of a “gatekeeper” evaluating qualifications in a hiring or admissions situation. Recently, the concept of “acceptability” (by gatekeepers) has been studied using credits earned online as a credential when applying to medical school (Adams, 2009), when applying to a university graduate program, (DeFleur and Adams, 2004) when applying for a job in a business hiring situation with a bachelor's degree earned wholly or partially online, (Adams and DeFleur, 2006) when seeking employment in a university faculty position, (Adams and DeFleur, 2005) and when seeking employment in the health professions (Adams, DeFleur, and Heald, 2007). In each of these surveys of gatekeeper respondents, the results indicated clearly that credits online were far less likely to be accepted as a qualification compared to credits earned in a traditional-residential setting. According to Adams’ (2009) survey of medical school administrators, that group of gatekeepers indicated that a traditional-residential degree is more acceptable than either online or community college degrees. For example, all of the gatekeeper respondents selected the applicant with a traditional-residential degree instead of the applicant with 50% of coursework taken online. Seven percent of the respondents elected to interview a candidate with 2 years of community college experience included in their 4-year degree. While these findings suggest that

attending a community college is far less acceptable than a traditional-residential degree from a 4-year institution, the administrators overwhelmingly selected the applicant who had attended the community college over one with 50% online and 50% traditional-residential coursework. In a time when professional programs are emphasizing the need for curricula that focus on patient-clinician relationships, online coursework seems to go against the tide. The social contacts necessary for building clinical skills, such as effective communication, understanding interpersonal dynamics, and management skills, appear to be very limited through an online course. Professional programs such as pharmacy and medical school often do not accept online classes. According to John Hopkins's Medical School website (2017), online classes are not acceptable for admission into their program. Pharmacy schools such as University of Southern California, the University of Washington, and the University of the Pacific range from not accepting specific science classes online to not accepting any online courses at all.

CHAPTER 3. METHODS

The purpose of this study was to examine, compare, and analyze the classes that cause pre-pharmacy students to change their academic plans of study and how that change impacts the student's ability to gain entry into a selective admission program. The researcher was interested in the relationship between the successful completion of the classes (especially the core classes) and admission into the pharmacy professional program. Many variables may affect the likelihood of admission, such as which track the student may be on, how many classes they completed before beginning at NDSU, and extracurricular commitments. This study looked at the hypothetical direction of influence, not causal effects.

Population/Sample Instrumentation

The population of this study was the set of students at NDSU who declared a pre-pharmacy major between September 2009 – May 2014. The timeframe was chosen so students would have enough time on campus to meet the admission requirements and apply (hopefully successfully) to the professional program. All students regardless of age, gender, and ethnicity were included in this study. A request was sent to the Office of Institutional Research and Analysis at North Dakota State University to provide the first and last names of all students who were declared pre-pharmacy majors from fall semester of 2009 to spring semester of 2014. This student information was public record meaning IRB approval was not needed in order for this Researcher to receive this information. It was determined there were 1,406 students (approximately evenly distributed across) in that time frame. This list formed the basis for our selection of students to include in the random sample. Specific academic files for the 1406

students are maintained in the College of Health Professions Dean’s Office. These files form the basis for our data collection.

Interval random sampling on the unit interval was used to identify a (simple) random sample of observations from the aforementioned population. According to Dillman (2000) (*Figure 2* reproduced with permission on next page) a population of 1,406 students combined with a 95% confidence interval and a conservative 50% effect size (or perhaps just as likely to stick to the plan versus deviate) requires a sample of approximately 290 students to make meaningful statistical reference.

Table 1

Dillman’s Sample Size

Sample size for the 95% confidence level						
Population	$\pm 10\%$ Sampling Error		$\pm 5\%$ Sampling Error		$\pm 3\%$ Sampling	
	50/50	80/20 Split	50/50 Split	80/20	50/50 Split	80/20 Split
10	49	38	80	71	92	87
20	65	47	13	11	16	15
40	78	53	19	15	29	25
60	83	56	23	17	38	32
80	86	57	26	18	45	36
1,00	88	58	27	19	51	40
2,00	92	60	32	21	69	50
4,00	94	61	35	23	84	58
6,00	95	61	36	23	90	61
8,00	95	61	36	24	94	62
10,000	96	61	37	24	96	64
20,000	96	61	37	24	1,013	66
40,000	96	61	38	24	1,040	67
100,000	96	61	38	24	1,056	67
1,000,000	96	61	38	24	1,066	68
1,000,000,000	96	61	384	246	1,067	683

Dillman shows the sample sizes needed for various population sizes and characteristics at three levels of precision. Adapted from *Mail and internet surveys: The tailored design method* by D. A. Dillman, 2000, p. 207. Copyright by John Wiley & Sons, Inc.

The interval random sampling process was implemented in a Microsoft excel spreadsheet using the population size (1,406) with a uniform distribution between 0 – 1. The continuous uniform distribution describes a set of data for which all values have an equal probability. One potential problem that may have been encountered in collecting data from student files was an incomplete (or inaccurate) student file. To ensure a sufficient number of files would contain complete (and accurate) information for this analysis a (conservative) decision was made to adjust the interval random sampling to ensure at least 300 students were selected. Our interval random sampling identified 325 students. This raw data file was saved however is not included due to the sheer size of the table/file.

Data Collection

Each student had an unofficial transcript available for viewing on Campus Connection and also in their paper file located in the Dean’s Office in Sudro Hall. This transcript showed their academic trajectory as a pre-pharmacy student (whether they were on the two year track or three year track) and any deviation that may have occurred. The student’s acceptance (or denial) letter for the pharmacy professional program was also contained in the paper file in the Dean’s Office. Upon reviewing the student’s file, coding would take place for the following items:

- deviation occurred (or not);
- every core “C”, “D”, or “F” earned;
- every non-core “C”, “D”, or “F” earned;
- dropped (W) core classes;
- dropped (W) non-core classes;
- admitted first time to professional program;
- admitted second time to professional program;

- not admitted to professional program; and
- course name and number of repeated classes.

As an example, Appendix Figure A4 presents a transcript of a (de-identified) pre-pharmacy student on the two year track. This student was used only as an example and was not within the definition of this population (current pre-pharmacy student). This student stayed on the two year track with academic success and achieved their goal of gaining admission into the pharmacy professional program on the first attempt. This student was a traditional student who earned 32 credits in high school (neither transfer or non-traditional). Appendix *Figure A5* depicts a (de-identified) pre-pharmacy student who deviated from the pre-pharmacy curriculum. This student was used only as an example and was not within the definition of this population (current pre-pharmacy student). This student had three core repeats (CHEM122, CHEM342, MICR350) plus multiple dropped classes (W). They also added five extra semesters onto their academic career compared with the three year track curriculum. This student was a traditional student who did gain admission to the pharmacy professional program on the first attempt.

Data Analysis

For this study, the data was collected and coded in Microsoft Excel. Any and all identifying factors were removed once the data is collected in its entirety from that student file. Each student was be given a “1” under the label if they fell into that category. For example, in Appendix A5, this student would be given a “1” under CHEM122 and CHEM342 for receiving a failing grade in each class.

When analyzing the data, we looked to determine if there are any specific academic reasons for a deviation in the academic plan. We assessed which class(es) proved to be detrimental to a pre-pharmacy student’s academic career (if any). If the student did deviate from

the pre-pharmacy curriculum, we observed whether it affected their chance to gain admission into the pharmacy professional program or not.

As mentioned earlier, the research questions are:

1. What classes tend to cause pre-pharmacy students to change their academic plan of study?
2. What effect does the change in plan of study have on getting into a selective admission professional program?

At the time, we had no knowledge of any relationship among these pre-pharmacy factors. Our null hypothesis was defined as there being no relationship between the variables (a lack of knowledge about the specific correlates).

Prior to data collection, a request to review the NDSU student data was requested and approved by the Institutional Review Board (IRB; Appendix A1). No students actively participated in this study. Data was collected from the student's most recent transcript and academic plan (if they have one) to assess their academic trajectory along with any deviation from the pre-pharmacy curriculum. Deviation of any kind was noted in three ways: 1) when the deviation took place, 2) what class or classes were affected, and 3) if the deviation affected their application and acceptance into the professional program. Once data was collected, descriptive statistics, chi-square tests and Fisher exact test (for discrete variable) were used to assess the relationship between the number of major changes and various quantifications of student

demographics. Various applications of the chi-square test were used to assess the relationship between the number of plan changes and admission outcomes. All tests employed 5% significance levels.

CHAPTER 4. RESULTS

The population of this study was a set of students at NDSU who declared a pre-pharmacy major between September 2009 – May 2014. It was determined there were 1,406 students in this time frame. By using interval random sampling, a population of 1,406 students combined with a 95% confidence interval and a conservative 50% effect size required a sample of approximately 260 students to make meaningful statistical reference. We decided to error on the side of being conservative and chose to sample 325 students.

Pre-Professional Course Grades and Admission into the Professional Pharmacy Program

Table 2 contains a series of cross-tabulations (with accompanying Chi Square and Fisher Exact tests) that characterized the relation between course grades in the pre-pharmacy curriculum and matriculation into the professional program.

Table 2

Cross-Tabulations of Pre-Professional Course Grades and Admission into the Professional Pharmacy Program

Course Name and Number	C, D, or F Grade Not Successfully Matriculate Into a Professional Program	C, D, or F Grade Successfully Matriculate Into a Professional Program	A or B Grade Not Successfully Matriculate Into a Professional Program	A or B Grade Successfully Matriculate Into a Professional Program	Total	Chi-Square Test Probability	Fisher Exact Test Probability
BIOL150	49	6	143	127	325	<0.001	<0.001
BIOL150L	13	1	179	132	325	0.009	0.010
BIOL220	38	9	154	124	325	0.001	0.001
BIOL220L	21	13	171	120	325	0.736	0.854
BIOL221	19	18	173	115	325	0.31	0.375
BIOL221L	9	7	183	126	325	0.814	0.801
CHEM121	60	3	132	130	325	<0.001	<0.001
CHEM121L	5	0	187	133	325	0.061	0.081
CHEM122	31	4	161	129	325	<0.001	<0.001
CHEM122L	0	0	192	133	325	NA	NA
CHEM341	30	16	162	117	325	0.361	0.420
CHEM341L	9	3	183	130	325	0.253	0.372
CHEM342	15	34	177	99	325	<0.001	<0.001
MATH146	37	7	155	126	325	<0.001	<0.001
ECON201	33	3	159	130	325	<0.001	<0.001
ECON105	8	0	184	133	325	0.017	0.023
STATS330	16	4	176	129	325	0.049	0.060
PHYS211	21	15	171	118	325	0.923	1.000
MICR202	10	0	182	133	325	0.008	0.006
MICR202L	12	0	180	133	325	0.003	0.002
MICR350	9	1	183	132	325	0.043	0.052
MICR350L	4	0	188	133	325	0.094	0.148
BIOC460	15	24	177	109	325	0.005	0.009
BIOC461	4	18	188	115	325	<0.001	<0.001

The first row in Table 2 shows a relationship between completing General Biology I (BIOL150) and matriculating into the professional program, the Pearson Chi-square test was statistically significant, $\chi^2 (1) = 24.67, p < 0.001$, this suggested there was a relationship between the student's success in General Biology 1 and their chance of being accepted into the pharmacy professional program. Forty nine students who earned a C, D, or F in General Biology I did not matriculate into the professional program out of 192 total nonmatriculating students. Only 6 students who earned a C, D, or F were able to matriculate into the professional program out of 133 total matriculating students.

The second row in Table 2 asserts a relationship between completing General Biology I lab (BIOL150L) and matriculating into the professional program indicated the Pearson Chi- square test was also statistically significant, $\chi^2 (1) = 6.91, p = 0.009$. This result indicated a relationship exists between the student's success in General Biology I lab and their chance of being accepted into the pharmacy professional program. Thirteen students who earned a C, D, or F in General Biology I lab did not matriculate into the professional program out of 192 total nonmatriculating students. Only 1 student who earned a C, D, or F were able to matriculate into the professional program out of 133 total matriculating students.

The third row in Table 2 asserts a relationship between completing Anatomy and Physiology I (BIOL220) and matriculating into the professional program indicated the Pearson Chi-square test was statistically significant, $\chi^2 (1) = 10.78, p = 0.001$. This result suggested there was a relationship between the student's success in Anatomy and Physiology I and their chance of being accepted into the pharmacy professional program. Thirty eight students who earned a C, D, or F in Anatomy and Physiology I did not matriculate into the professional program out of

192 total nonmatriculating students. Only 9 students who earned a C, D, or F were able to matriculate into the professional program out of 133 total matriculating students.

The seventh row in Table 2 asserts a relationship between completing General Chemistry I (CHEM121) and matriculating into the professional program indicated the Pearson Chi-square test was statistically significant, $\chi^2(1) = 42.27, p < 0.001$. This result indicated a relationship exists between the student's success in General Chemistry I and their chance of being accepted into the pharmacy professional program. Sixty students who earned a C, D, or F in General Chemistry I did not matriculate into the professional program out of 192 total nonmatriculating students. Only 3 students who earned a C, D, or F were able to matriculate into the professional program out of 133 total matriculating students.

The ninth row in Table 2 asserts a relationship between completing General Chemistry II (CHEM122) and matriculating into the professional program indicated the Pearson Chi-square test was statistically significant, $\chi^2(1) = 14.11, p < 0.001$. This result suggested there was a relationship between the student's success in General Chemistry II and their chance of being accepted into the pharmacy professional program. Thirty one students who earned a C, D, or F in General Chemistry II did not matriculate into the professional program out of 192 total nonmatriculating students. Only 4 students who earned a C, D, or F were able to matriculate into the professional program out of 133 total matriculating students.

The fourteenth row in Table 2 asserts a relationship between completing Applied Calculus I (MATH146) and matriculating into the professional program indicated the Pearson Chi-square test was statistically significant, $\chi^2(1) = 13.17, p < 0.001$. This result indicated a relationship exists between the student's success in Applied Calculus I and their chance of being accepted into the pharmacy professional program. Thirty seven students who earned a C, D, or F

in Applied Calculus I did not matriculate into the professional program out of 192 total nonmatriculating students. Only 7 students who earned a C, D, or F were able to matriculate into the professional program out of 133 total matriculating students.

The fifteenth row in Table 2 asserts a relationship between completing Microeconomics (ECON201) and matriculating into the professional program indicated the Pearson Chi-square test was statistically significant, $\chi^2 (1) = 17.79, p < 0.001$. Similar results were experienced (sixteenth row in Table 2) with Elements of Economics (ECON105), $\chi^2 (1) = 5.68, p = 0.023$. (ECON105 was replaced in the pre-pharmacy curriculum with ECON201). The results suggested there was a relationship between the student's success in Economics (ECON201 and ECON105) and their chance of being accepted into the pharmacy professional program. Thirty three students who earned a C, D, or F in Microeconomics and 8 students in Elements of Economics did not matriculate into the professional program out of 192 total nonmatriculating students. Only 3 students who earned a C, D, or F in Microeconomics, and 0 students in Elements of Economics, were able to matriculate into the professional program out of 133 total matriculating students.

The seventeenth row in Table 2 asserts a relationship between completing Introductory Statistics (STAT330) and matriculating into the professional program indicated the Pearson Chi-square test was statistically significant, $\chi^2 (1) = 3.86, p = 0.049$. This result indicated a relationship exists between the student's success in Introductory Statistics and their chance of being accepted into the pharmacy professional program. Sixteen students who earned a C, D, or F in Introductory Statistics did not matriculate into the professional program out of 192 total nonmatriculating students. Only 4 students who earned a C, D, or F were able to matriculate into the professional program out of 133 total matriculating students.

The nineteenth, twentieth, and twenty first rows in Table 2 asserts a relationship between completing Introductory Microbiology (MICR202), Introductory Microbiology Lab (MICR202L), or General Microbiology (MICR350) and matriculating into the professional program indicated the Pearson Chi-square test was statistically significant, $\chi^2 (1) = 7.15, p = 0.008$, $\chi^2 (1) = 8.63, p = 0.002$, and $\chi^2 (1) = 4.08, p = 0.043$ respectively. This result suggested there was a relationship between the student's success in Microbiology (MICR202, MICR202L, and MICR350) and their chance of being accepted into the pharmacy professional program. Thirty one students who earned a C, D, or F in Microbiology (MICR202, MICR202L, and MICR350) did not matriculate into the professional program out of 192 total nonmatriculating students. Only 1 student who earned a C, D, or F were able to matriculate into the professional program out of 133 total matriculating students.

The following three classes found slightly different results. While they were statistically significant, the student's chance of matriculating into the professional pharmacy program wasn't as negatively affected due to the C, D, or F grade earned as were the above classes. The thirteenth row in Table 2 asserts a relationship between completing Organic Chemistry II (CHEM342) and matriculating into the professional program indicated the Pearson Chi-square test was statistically significant, $\chi^2 (1) = 19.34, p < 0.001$. This result indicated a relationship exists between the student's success in Organic Chemistry II and their chance of being accepted into the pharmacy professional program. Fifteen students who earned a C, D, or F in Organic Chemistry II did not matriculate into the professional program out of 192 total nonmatriculating students. However 34 students who earned a C, D, or F were able to matriculate into the

professional program out of 133 total matriculating students. This is one of three statistically significant results (along with BIOC460 and BIOC461) where the student's chance of matriculating isn't as detrimental due to the C, D, or F grade earned.

The twenty third and twenty fourth rows in Table 2 asserts a relationship between completing Biochemistry I and II (BIOC460 and BIOC461) and matriculating into the professional program indicated the Pearson Chi-square test was statistically significant, $\chi^2 (1) = 7.79, p = 0.009$ and $\chi^2 (1) = 16.32, p < 0.001$ respectively. This result suggested a relationship between the student's success in Biochemistry I and II and their chance of being accepted into the pharmacy professional program. Fifteen students who earned a C, D, or F in Biochemistry I and 4 students who earned a C, D, or F in Biochemistry II did not matriculate into the professional program out of 192 total nonmatriculating students. However 24 students who earned a C, D, or F in Biochemistry I and 18 students who earned a C, D, or F in Biochemistry II were able to matriculate into the professional program out of 133 total matriculating students.

In this section, we reviewed the results from the grades earned in pre-pharmacy classes and matriculation into the professional program to determine if a relationship as suggested. In the following section, we reviewed the results from the withdrawals of pre-pharmacy classes and the matriculation into the professional program to determine if a relationship was suggested.

Pre-Professional Course Withdrawals and Admission into the Professional Pharmacy Program

Table 3 addresses Research Question 2 by looking at a series of cross-tabulations (with accompanying Chi Square and Fisher Exact tests) that characterizes the relation between withdrawals in the pre-pharmacy curriculum and matriculation into the professional program.

Table 3

Cross-Tabulations of Pre-Professional Course Withdrawals and Admission into the Professional Pharmacy Program

Course Name	Withdraw from Class Not Successfully Matriculate Into a Professional Program	Withdraw from Class Successfully Matriculate Into a Professional Program	No Withdraw from Class Not Successfully Matriculate Into a	No Withdraw from Class Successfully Matriculate Into a Professional Program	Total	Chi-Square Test Probability	Fisher Exact Test Probability
BIOL150	14	4	178	129	325	0.097	0.138
BIOL150L	0	0	192	133	325	NA	NA
BIOL220	7	2	185	131	325	0.247	0.318
BIOL220L	2	1	190	132	325	0.788	1
BIOL221	0	0	192	133	325	NA	NA
BIOL221L	0	0	192	133	325	NA	NA
CHEM121	9	0	183	133	325	0.011	0.012
CHEM121L	0	0	192	133	325	NA	NA
CHEM122	8	1	184	132	325	0.065	0.088
CHEM122L	0	0	192	133	325	NA	NA
CHEM341	7	3	185	130	325	0.475	0.535
CHEM341L	0	1	192	132	325	0.229	0.409
CHEM342	6	3	186	130	325	0.639	0.742
MATH146	8	4	184	129	325	0.586	0.767
ECON201	2	0	190	133	325	0.238	0.515
ECON105	3	0	189	133	325	0.148	0.272
STATS330	3	3	189	130	325	0.648	0.692
PHYS211	5	3	187	130	325	.0648	0.692
MICR202	0	0	192	133	325	NA	NA
MICR202L	0	0	192	133	325	NA	NA
MICR350	1	1	191	132	325	0.793	1
MICR350L	0	0	192	133	325	NA	NA
BIOC460	5	1	187	132	325	0.223	0.407
BIOC461	0	4	192	129	325	0.016	0.027

The seventh row in Table 3 asserts a relationship between withdrawing from General Chemistry I (CHEM121) and matriculating into the professional program indicated the Pearson Chi-square test was statistically significant, $\chi^2 (1) = 6.41, p = 0.012$. This result indicated a significant relationship exists between the student's success (or lack thereof resulting in a withdrawal) in General Chemistry I and their chance of being accepted into the pharmacy professional program. Nine students who withdrew from General Chemistry I did not matriculate into the professional program out of 192 total nonmatriculating students. No students who withdrew were able to matriculate into the professional program out of 133 total matriculating students. General Chemistry I is the pre-requisite chemistry course for all required chemistry courses in the pre-pharmacy curriculum. If a student withdraws from General Chemistry I they are not eligible to move on until General Chemistry I is successfully completed halting their ability to move forward in the chemistry portion of the pre-pharmacy curriculum.

CHAPTER 5. CONCLUSIONS, DISCUSSIONS, AND RECOMMENDATIONS

The professional pharmacy program at NDSU requires the completion of pre-professional basic science and math coursework, yet does not guarantee a student's acceptance into the professional program upon completion of those courses. The professional program, has high expectations for its students as evident through its rigorous admission process, structured and challenging curriculum, high credit loads, and its co-curricular program standards that are required of all professional program students. If students do not meet these expectations, they do not achieve admission. Unfortunately, every semester there are students who do not achieve the grades or complete the classes needed to be a competitive applicant. The research questions used to guide this study were:

1. What classes tend to cause pre-pharmacy students to change their academic plan of study?
2. What effect does the change in plan of study have on getting into a selective admission professional program?

Conclusions

The purpose of this study was to examine, compare, and analyze the classes that cause pre-pharmacy students to change their academic plans of study and how that change impacts the student's ability to gain entry into a selective admission program. The researcher was interested in the relationship between the successful completion of the classes (especially the core classes) and admission into the pharmacy professional program. Many variables may affect the likelihood of admission, such as which track the student may be on, how many classes they completed

before beginning at NDSU, and extracurricular commitments. This study looked at the hypothetical direction of influence, not causal effects.

Regarding Research Question #1, the results yielded the following findings:

1. Earning a grade of C, D, or F in BIOL150, BIOL150L, BIOL220, CHEM121, CHEM122, MATH146, ECON201 or ECON105, STAT330, MICR202, MICR202L, or MICR350 is detrimental to matriculating into the pharmacy professional program.
2. Earning a grade of C, D, or F in CHEM342, BIOC460, or BIOC461, while statistically significant and detrimental, it is not as detrimental to matriculating into the pharmacy professional program as the above 12 classes.

From these results, the researcher concluded there are 15 classes that do cause pre-pharmacy students to change their academic plans of study. Twelve of the classes prohibit pre-pharmacy students from matriculating into the professional program if they are not successfully completed (A or B grade).

Regarding Research Question #2, the results yielded the following finding:

1. Withdrawing from CHEM121 is detrimental to matriculating into the pharmacy professional program.

From these results, the researcher concluded there is only one class (CHEM121) that halts a pre-pharmacy student's progression if they withdraw from it. No student was able to withdraw from General Chemistry I (CHEM121) and still matriculate into the professional program.

Discussion

Pressure comes in many forms for students such as some institutions wanting every student to take at least 15 credits every semester, parents discouraging students from taking out

student loans, and students not wanting to be in college “forever.” College students feel pressured to finish their academic careers “on time” or even early. By doing so, they have to maintain a rigorous credit load which decreases the time available for each class outside of the classroom along with decreasing the time available for the student to work, gain valuable experience in their chosen field (internships/job shadowing), join campus organizations suggested for favorable admission into their program, and spend time decompressing by enjoying leisure activities, working out, and time with friends and family. This also does not take into consideration the rigor of the students course load. When a student takes on too much and does not succeed in the classroom, they must retake the course(s) (if they are permitted by the admission committee), which requires remediating their grade(s), adjusting their academic plan which may now include adding extra time on campus, getting “back on track”, along with an impending sense of failure and falling “behind”. The results of this analysis suggest there are specific classes that do affect matriculation if they are not successfully completed (A or B grade). In fact, the results suggest that several classes result in almost no matriculation into the professional program if said class is not passed with an A or B grade. The NDSU Pharmacy Admission Committee has taken that into consideration and allows the student 3 core class retakes to earn a better grade. However, this also limits the number of opportunities for remediation in these circumstances.

There are many pre-pharmacy classes (some are core classes) that pre-pharmacy students do not seem to find problematic: College Composition II, Fundamentals of Public Speaking, Intercultural Communication, Humanities and Fine Arts electives, Wellness elective, and an Upper Level English course. These courses are arranged within the curriculum to provide a reprieve for the student so they do not have all science and math courses in one semester. By

layering the knowledge versus taking any class any time, the students build on the knowledge gained from the previous semester. It also helps to reinforce that material previously learned.

There are several classes that may prove to be problematic for students. However, earning a grade of C, D, or F in BIOL220L, BIOL221, BIOL221L, CHEM121L, CHEM122L, CHEM341, CHEM341L, PHYS211, or MICR350L has not been detrimental for students matriculating into the pharmacy professional program. The labs in the pre-pharmacy curriculum are usually one credit (with the exception of MICR350L which is 2 credits), offered one day a week, and not overly rigorous in the amount of work or time needed to earn a C or better grade in order to matriculate into the professional program. With the labs worth 1 credit, earning a C in the lab is not as detrimental to the pre-pharmacy student's GPA as a C grade in a 3 or 4 credit class. CHEM121L, CHEM122L, CHEM341L, and BIOL221L are not core classes. Earning a C in these labs will not affect a student's core GPA. It will affect the student's cumulative GPA which is a concern if the student is in the 2.9-3.1 grade point average range. PHYS211 and BIOL221 are taken at the end of the second year semester because neither of the classes are core classes. In order for the student to secure their place in the professional program, both classes need to be passed with a C or better.

There are several classes that may prove to be problematic enough that students need to withdraw from them such as BIOL150, BIOL150L, BIOL220, BIOL220L, BIOL221, BIOL221L, CHEM121L, CHEM122, CHEM122L, CHEM341, CHEM341L, CHEM342, MATH146, ECON201 or ECON105, STAT330, PHYS211, MICR202, MICR202L, MICR350, MICR350L, BIOC460, or BIOC461 however, withdrawing has not been detrimental for students matriculating into the pharmacy professional program. BIOL150/L, CHEM121L, CHEM122/L, MATH146, ECON201, and STAT330 are typically taken in the first year of pre-pharmacy but

also by students of other majors. Since they are popular classes, they also tend to be offered every semester. If a student needs to withdraw from one of these classes, they have the ability to enroll in the class again the following semester. This will not set a student behind in their academic plan unless they are on the two year track and it is a chemistry course that was withdrawn from. CHEM341/L and CHEM342 are taken in the summer between the first and second year on the two year track and during the second year of the 3 year track. If the student must withdraw from CHEM341/L or CHEM342 in the summer on the two year track, the student has the ability to move to the three track and take them in their second year. If the student must withdraw from CHEM342 in the summer on the two year track, they have the option to take CHEM342 online (through the Tri-College), apply for the professional program, and take Special Topics in Pharmaceutical Biochemistry (PSCI499) in the following summer in order to stay on track. If the student must withdraw from CHEM341/L or CHEM342 during the second year on the three year track, the student has the option to take the class the next semester and continue on their academic path. This may result in the students taking CHEM342 in the summer between the second year and third year however most students are happy to do so as it keeps them on their projected academic trajectory by doing so. BIOL220/L and BIOL221/L are taken in the second year on both the two year track and three year track. Most students are capable of earning a C in the class and lab while earning an A or B does prove to be much more challenging. If the student is on the three track, the student has the option to withdraw from the course and take it in the third year. The students on the two year track tend to stay in the class regardless of a C grade so they are able to apply to the professional program and not adjust their academic trajectory. Pre-pharmacy students have the option to take MICR202/L (3 credits) or MICR350/L (5 credits). MICR350/L is recommended however it is only offered during the fall semester. If the student is

unable to fit MICR350/L into their schedule or their schedule looks to be too rigorous (credit load is too high), the student is able to complete MICR202/L which is offered every semester. If a student attempts MICR350/L but must withdraw from it, they are able to take MICR202/L the next semester or they can wait until the following fall semester to attempt MICR350/L again.

Upon analysis, the results contained in Table 2 suggest that many of the science and math based courses such as General Chemistry I and II (CHEM121 & CHEM122), General Biology I (BIOL150), Anatomy and Physiology I (BIOL220), Introduction to Microbiology and the lab (MICR202 & MICR202L) along with General Microbiology (MICR350), Applied Calculus (MATH46), Economics (ECON105 & ECON201), and Statistics (STAT330) do affect matriculation into the professional program. If a pre-pharmacy student earned a grade of C, D, or F in any of these classes, they were less likely to matriculate into the pharmacy professional program. All of these classes also happen to be core classes. Successful completion of core classes are especially important in the pre-pharmacy curriculum (Policy #2.21.1). The total number of pre-pharmacy core courses which may be repeated shall be limited to three. The grade received during the student's final attempt for any core pre-pharmacy course will be used in evaluation for admission. A withdrawal is not considered an attempt. A core course is one that is included in the GPA for admission purposes (NDSU Pharmacy Handbook, 2017).

Organic Chemistry II (CHEM342) along with Biochemistry I (BIOC460) and II (BIOC461) are the only classes that showed a statistically significant result, however the C, D, or F grade earned was not as detrimental to the student's chance of matriculating into the professional program as the previously discussed 12 classes. This may be influenced by the fact that most of the students repeated the course or were able to complete an alternate course to replace the low grade. Difficult courses and courses at the end of the pre-pharmacy curriculum

have more flexibility to repeat the course whether by choice or necessity (if they were accepted with a C grade). Typically Organic Chemistry II is taken in the spring semester; it is also available during the summer if a student needed to repeat the course in order to be able to move forward into Biochemistry I (BIOC460) in the fall since Organic Chemistry II (CHEM342) is a pre-requisite for Biochemistry I (BIOC460). If a pre-pharmacy student is not successful in Biochemistry I (BIOC460) and/or II (BIOC461), the student also had the option of taking Special Topics in Pharmaceutical Biochemistry (PSCI499) in the summer which allowed them to move into the professional program if they were conditionally accepted.

The only statistically significant relationship analyzed between withdrawing from a class and matriculating into the professional program was General Chemistry I (CHEM121). This result indicated no student who withdrew from General Chemistry I (CHEM121) was able to matriculate into the professional program. General Chemistry I (CHEM121) is the first chemistry course the students take in college and is a pre-requisite for all of the required chemistry courses in the pre-pharmacy curriculum. If a student withdrew from General Chemistry I (CHEM121) they are not eligible to move on until General Chemistry I is successfully completed halting their ability to move forward in the chemistry portion of the pre-pharmacy curriculum. Withdrawing from General Chemistry I (CHEM121) in the first semester often leads to a realization that chemistry and/or pharmacy is not for them and they change their major or they must retake General Chemistry I (CHEM121) during the spring semester putting them behind in their chemistry sequence. If the student is on the 2 year track, they are no longer able to stay on the 2 year track and must move to the 3 year track. If the student is on the 3 year track, they must now take a chemistry class in the summer in order to get back on track.

Limitations

This study did not take into consideration any additional factors that affect admission into the professional pharmacy program such as the Pharmacy College Admissions Test (PCAT) score or the interview process. The design and content of the PCAT is determined by the types of abilities, aptitudes, and skills deemed essential by pharmacy colleges for admission purposes. If a student successfully completes the pre-pharmacy curriculum, they should have the content knowledge needed to successfully take the PCAT exam. If the student struggles through the pre-pharmacy curriculum, they will have an average content knowledge base which may not be enough knowledge to be successful on the PCAT. The timing of the PCAT is a factor as well. If the student takes the PCAT too soon in their academic career, they will not have gained enough content knowledge to accurately prepare them for the PCAT content. The PCAT is a timed exam which also challenges the students to make quick decisions accurately. If a student is a poor test taker, they have to rely more heavily on their grades and their interviewing abilities to get them into the professional program. The PCAT is typically taken in the summer (July) or fall (September or October/November) prior to the application deadline (December 31) which does not allow the student much time to make appropriate adjustments if their PCAT score did not prove to be as successful as they were hoping. It also does not afford the student much time (if any) to raise a core course grade (or 2-3) if they have any retakes left in order to help offset a low PCAT score. If the student does not interview well, their PCAT score and grades are not enough to get them into the professional program alone. Interviews are only held once a year, which tends to put pressure on the students to make the most of their opportunity. There are several reliable resources available to the student to help develop their interviewing skills such as the Career Center at NDSU and an annual Interview Boot Camp hosted by the pharmacy academic

advisor. Most recently, the advisor has also held mock interviews to simulate NDSU's interview process in a constructive manner.

Recommendations for Further Studies

The diversity of the sample population was intended to analyze only pre-pharmacy students. Further research using additional selective admission program students with similar curricula may provide additional insight on course challenges that students face at NDSU. Analyzing course sequencing and course offerings at NDSU may also provide additional insight on courses impacting a student's academic trajectory. This study exhibited several potential confounding effects based on changes that occurred with the pre-pharmacy curriculum during the time frame observed for this study. Applied Calculus II (MATH147) was removed from the pre-pharmacy curriculum. Elements of Economics (ECON105) was changed to Microeconomics (ECON201). Organic Chemistry II (CHEM342) and Biochemistry I (BIOC460) were core classes to begin with, however they were removed from the core class list midway through this study's timeframe. For future studies, it would be beneficial to choose a timeframe without any curricular changes.

Recommendations for Practice

An academic advisor advises a student to make good choices, gives them tips on being successful at college, and much more however some of that information is taken with speculation until the student truly finds themselves in need of advising because they are in trouble (academically or otherwise). With the results from this study, it will be more effective to demonstrate how important grades are for selective admission programs.

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APPENDIX



September 14, 2017

Dr. Thomas Hall
School of Education

IRB Approval of Protocol #HE18049, "Staying on an Academic Plan: Is it really that necessary for gaining acceptance into selective admission programs?"
Co-investigator(s) and research team: Kelly Fahy Haugen

Approval period: 9/14/2017 to 9/13/2018
Continuing Review Report Due: 8/1/2018

Research site(s): NDSU Funding Agency: n/a
Review Type: Expedited category # 5
IRB approval is based on the revised protocol submission (received 9/11/2017).

Additional approval from the IRB is required:
o Prior to implementation of any changes to the protocol (Protocol Amendment Request Form).
o For continuation of the project beyond the approval period (Continuing Review/Completion Report Form). A reminder is typically sent approximately 4 weeks prior to the expiration date; timely submission of the report the responsibility of the PI. To avoid a lapse in approval, suspension of recruitment, and/or data collection, a report must be received, and the protocol reviewed and approved prior to the expiration date.

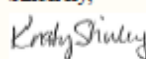
Other institutional approvals:
• Research projects may be subject to further review and approval processes.

A report is required for:
o Any research-related injuries, adverse events, or other unanticipated problems involving risks to participants or others within 72 hours of known occurrence (Report of Unanticipated Problem or Serious Adverse Event Form).
o Any significant new findings that may affect risks to participants.
o Closure of the project (Continuing Review/Completion Report Form).

Research records are subject to random or directed audits at any time to verify compliance with human subjects protection regulations and NDSU policies.

Thank you for cooperating with NDSU IRB procedures, and best wishes for a successful study.

Sincerely,


Digitally signed by Kristy Shirley
DN: cn=Kristy Shirley, ou=NDSU,
ou=Institutional Review Board,
email=kristy.shirley@ndsu.edu,
c=US
Date: 2017.09.14 11:52:30 -0500

Kristy Shirley, CIP, Research Compliance Administrator

For more information regarding IRB Office submissions and guidelines, please consult www.ndsu.edu/irb. This Institution has an approved Federal Wide Assurance with the Department of Health and Human Services: FWA00002439.

INSTITUTIONAL REVIEW BOARD
NDSU Dept 4000 | PO Box 6050 | Fargo ND 58108-6050 | 701.231.8995 | Fax 701.231.8098 | ndsu.edu/irb
Shipping address: Research 1, 1735 NDSU Research Park Drive, Fargo ND 58102
ndsu is an equal opportunity

Figure A1. Institutional Review Board Approval

NDSU ENTRY-LEVEL PHARM. PROGRAM
Pre-Pharmacy Curriculum
Students applying November 2013 and beyond

Two Year Track with summer session (4 Semesters + 1 Summer Session, 76 credits - includes credit for Engl 110)

FIRST YEAR (39 credits)			
FALL	Cr	SPRING	Cr
Chem 121, General Chemistry I *	3	Chem 122, General Chemistry II *	3
Chem 121L, General Chemistry I Lab	1	Chem 122L, General Chemistry II Lab	1
English 120, Comp II ¹	3	Comm 110, Fundamentals *	3
Math 146, Applied Calculus I *	4	Econ 201, Microeconomics *	3
Biol 150/150L, General Biology I/Lab *	3/1	Stat 330, Introductory Statistics *	3
University 189, Study Skills	1	Elective - Humanities & Fine Arts	3
	16		16

SUMMER SESSION – Chem 341*/341L, Organic Chemistry I and Lab, 3 + 1 cr.
 Chem 342*, Organic Chemistry II, 3 cr.

¹ Students with composite ACT scores of 20 or lower must register for English 100 and 110 Fall Semester and take Engl 120 Spring Semester. Students who complete English 120 with a "C" or higher will receive credit for English 110 with a passing grade (P).

SECOND YEAR (34 credits)			
FALL	Cr	SPRING	Cr
Bioc 460, Biochemistry & Molecular Biology I *	3	Bioc 461, Biochemistry & Molecular Biology II	3
Biol 220/220L, Human Anat & Physio I *	3/1	Biol 221/221L, Human Anat & Physio II	3/1
Comm 216, Intercultural Comm *	3	Engl 324 or 325, Upper division English	3
Micr 202/202L or 350/350L *	2/1	Micr 460, Pathogenic Microbiology	3
Elective - Humanities & Fine Arts	3	Phys 211, College Physics I	3
		Wellness	2
	16		18

*Selected core courses will be used for selection criteria to determine GPA used in calculation for admission to the professional program. These courses must show evidence of letter grade, or other means of demonstrating acceptable competency (i.e. AP – CEEB) and **MUST** be completed by the end of fall semester prior to the December 31 deadline to apply to the pharmacy program. Remaining courses, which are required and listed in the pre-pharmacy curriculum, **MUST** be completed by the end of spring term. The only exception to this is that up to six credits of electives may be completed during the summer term.

(All courses must be completed with at least a grade of "C.")

Figure A2. Two Year Track Pre-Pharmacy Curriculum

NDSU ENTRY-LEVEL PHARM.D. PROGRAM
Pre-Pharmacy Curriculum
 Students applying November 2013 and beyond

Three year track. Allows room for a minor of study. (6 Semesters, 94 credits
 - includes credit for Engl 110)

FIRST YEAR (31 credits)			
FALL	Cr	SPRING	Cr
Biol 150/150L, General Biology/Lab *	3/1	Chem 122, General Chemistry II *	3
Chem 121, General Chemistry I *	3	Chem 122L, General Chemistry II Lab	1
Chem 121L, General Chemistry I Lab	1	Comm 110, Fundamentals *	3
Math 146, Applied Calculus I *	4	English 120, Composition II ¹ *	3
Elective - Humanities & Fine Arts	3	Elective - Humanities & Fine Arts	3
University 189, Study Skills	1	Wellness	2
	16		15

¹ Students with composite ACT scores of 20 or lower must register for English 100 and 110 Fall Semester and take Engl 120 Spring Semester. Students who complete English 120 with a "C" or higher will receive credit for English 110 with a passing grade (P).

SECOND YEAR (33 credits)			
FALL	Cr	SPRING	Cr
Chem 341, Organic Chemistry I *	3	Biol 221/221L, Human Anat & Physio II	3/1
Chem 341L, Organic Chemistry I Lab	1	Chem 342, Organic Chemistry II *	3
Biol 220/220L, Human Anat & Physio I *	3/1	Phys 211, College Physics I	3
Comm 216, Intercultural Comm *	3	Credits towards Minor	6
Econ 201, Microeconomics *	3		
Credits towards Minor	3		
	17		16

THIRD YEAR (30 credits)			
FALL	Cr	SPRING	Cr
Bioc 460, Biochemistry I *	3	Bioc 461, Biochemistry II	3
Stat 330, Introductory Statistics *	3	Engl 324 or 325, Upper Division English	3
Micr 202/202L or 350/350L *	2/1	Micr 460, Pathogenic Microbiology	3
Credits towards Minor	6	Credits towards Minor	6
	15		15

*Selected core courses will be used for selection criteria to determine GPA used in calculation for admission to the professional program. These courses must show evidence of letter grade, or other means of demonstrating acceptable competency (i.e. AP – CEEB) and **MUST** be completed by the end of fall semester prior to the December 31 deadline to apply to the pharmacy program. Remaining courses, which are required and listed in the pre-pharmacy curriculum, **MUST** be completed by the end of spring term.

(ALL courses must be completed with at least a grade of "C.")

Figure A3. Three Year Track Pre-Pharmacy Curriculum

North Dakota State University
Unofficial Transcript

Name: _____
Student ID: _____

Print Date: 2017-07-18
Institution Info: North Dakota State University
1301 12th Avenue North
Fargo, ND 58105
Student Address: _____

Term GPA: 4.000 Term Totals: Attempted 15,000 Earned 15,000 GPA Units 15,000 Points 60,000
Cum GPA: 4.000 Cum Totals: Attempted 65,000 Earned 65,000 GPA Units 38,000 Points 100,000
Special GPA: 4.000 Inst GPA excluding Transfer Cr
Special GPA: 3.858 Total Cum GPA incl Transfer Cr
Special GPA: 3.825 Transfer GPA
Term Honor: Dean's List

Test ID	Test Category	Test Date	Test Score	Data Source
ACT	Composite	04/06/2014	28.00	ACT
ACT	English	04/06/2014	24.00	ACT
ACT	Mathematics	04/06/2014	33.00	ACT
NDSU MATH	Algebra	06/03/2015	15.00	SCH
NDSU MATH	Pre-Calculus	06/03/2015	8.00	SCH

Test Credits

Placement Credit - Eng	Placement Credit - Engl Comp I	Points
Transferred to Term 2015 Fall as		0.00
ENGL 110	College Composition I	3.000

2016 Summer

Program Plan	Description	Attempted	Earned	Grade	Points
CHEM 341 CHEM 342	Organic Chemistry I	3,000	3,000	B	9,000
	Organic Chemistry II	3,000	3,000	B	9,000
Term GPA:		3,993	3,993		12,000
Cum GPA:		3,833	3,833		12,000
Special GPA:		3,733	3,733		12,000
Special GPA:		3,825	3,825		12,000

Transfer Credits

Transfer Credit from North Dakota State College of Science	Attempted	Earned	Points
Course Trans GPA: 0.000	32,000	32,000	0.000

2016 Fall

Program Plan	Description	Attempted	Earned	Grade	Points
CHEM 480 CHEM 341L COMM 218 MCR 350 MCR 350L PHIL 215	Food/Biochem/Molecular Biol I	3,000	3,000	B	9,000
	Organic Chemistry II Laboratory	1,000	1,000	B	3,000
	Intercultural Communication	3,000	3,000	A	12,000
	General Microbiology	3,000	3,000	B	9,000
	General Microbiology Lab	2,000	2,000	B	6,000
Contemporary Moral Issues	3,000	3,000	A	12,000	

Beginning of Undergraduate Record

2015 Fall

Program Plan	Description	Attempted	Earned	Grade	Points
CHEM 121 CHEM 121L COMM 130 ENGL 120 MATH 149 PHRM 189	General Chemistry I	3,000	3,000	A	12,000
	General Chemistry I Laboratory	1,000	1,000	A	4,000
	Fundamentals/ Public Speaking	3,000	3,000	A	12,000
	College Composition II	3,000	3,000	A	12,000
	Applied Calculus I	4,000	4,000	A	16,000
	Skills for Academic Success	1,000	1,000	A	4,000

Term GPA:	4.000	Term Totals:	Attempted	Earned	GPA Units	Points
Cum GPA:	4.000	Cum Totals:	15,000	15,000	15,000	60,000
Special GPA:	4.000	Inst GPA excluding Transfer Cr	15,000	15,000	15,000	60,000
Special GPA:	3.745	Total Cum GPA incl Transfer Cr	65,000	65,000	38,000	100,000
Special GPA:	3.825	Transfer GPA				
Term Honor:	Dean's List					

2017 Spring

Program Plan	Description	Attempted	Earned	Grade	Points
CHEM 122 CHEM 122L ECON 201 HNES 100 PHIL 101 STAT 350	General Chemistry II	3,000	3,000	A	12,000
	General Chemistry II Laboratory	1,000	1,000	A	4,000
	Principles of Microeconomics	3,000	3,000	A	12,000
	Concepts/Fitness & Wellness	2,000	2,000	A	8,000
	Introduction to Philosophy	3,000	3,000	A	12,000
Introductory Statistics	3,000	3,000	A	12,000	

Program Plan	Description	Attempted	Earned	Grade	Points
ANTH 304 BIOC 481 ENGL 324 MCR 483 PHYS 211	Archaeology and Prehistory	3,000	3,000	W	0,000
	Food/Biochem/Molecular Biol II	3,000	3,000	B	9,000
	Writing/Sciences	3,000	3,000	A	12,000
	Pathogenic Microbiology	3,000	3,000	B	9,000
	College Physics I	3,000	3,000	A	12,000

Term GPA:	3.500	Term Totals:	Attempted	Earned	GPA Units	Points
Cum GPA:	3.667	Cum Totals:	12,000	12,000	12,000	42,000
Special GPA:	3.667	Inst GPA excluding Transfer Cr	12,000	12,000	12,000	42,000
Special GPA:	3.653	Total Cum GPA incl Transfer Cr	98,000	98,000	60,000	231,000
Special GPA:	3.825	Transfer GPA				
Term Honor:	Dean's List					

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Figure A4. Sample Pre-pharmacy Unofficial Transcript Of Student On Track

North Dakota State University
Unofficial Transcript

Name:
Student II

Print Date: 2017-07-18
Institution Info: North Dakota State University
1301 12th Avenue North
Grand Forks, ND 58106

Term GPA: 3.250
Cum GPA: 3.200
Special GPA: 3.200
Special GPA: 3.200
Special GPA: 0.000

Term Totals:
Cum Totals: 16.000
36.000

Inst GPA excluding Transfer Cr
Total Cum GPA incl Transfer Cr
Transfer GPA

Attempted 16.000
Earned 16.000
36.000

GPA Units 18.000
30.000

Points 52.000
96.000

Test Scores

Test ID	Test Component	Test Date	Test Score	Data Source
ACT	Composite	06/01/2012	21.00	ACT
ACT	English	06/01/2012	19.00	ACT
ACT	Mathematics	06/01/2012	18.00	ACT
NDSU MATH	Algebra	07/18/2013	8.00	SCH
NDSU MATH	Pre-Calculus	07/18/2013	6.00	SCH

Test Credits

Placement Credit - Eng	Placement Cred - Engl Comp I	Transferred to Term 2014 Spring as	Grade	Earned	Points
ENGL 110	College Composition I		P	3.000	0.000

Transfer Credits

Course Trans	GPA	Transfer Totals	Attempted	Earned	Points
	0.000		3.000	3.000	0.000

2013 Fall

Program: Pharmaceutical Sciences
Plan: Pre-Pharmacy

Course	Description	Attempted	Earned	Grade	Points
BIOL 150	General Biology I	3.000	3.000	B	9.000
BIOL 150L	General Biology I Laboratory	1.000	1.000	A	4.000
ECON 201	Principles of Microeconomics	3.000	3.000	A	12.000
HIST 101	Western Civilization I	3.000	3.000	B	9.000
MATH 103	College Algebra	3.000	3.000	C	6.000
PHRM 109	Skills for Academic Success	1.000	1.000	A	4.000

Term GPA: 3.143
Cum GPA: 3.143
Special GPA: 3.143
Special GPA: 3.143
Special GPA: 0.000

Term Totals: 14.000
Cum Totals: 17.000

Inst GPA excluding Transfer Cr
Total Cum GPA incl Transfer Cr
Transfer GPA

Attempted 14.000
Earned 14.000
14.000

GPA Units 14.000
44.000

Points 44.000

2014 Spring

Program: Pharmaceutical Sciences
Plan: Pre-Pharmacy

Course	Description	Attempted	Earned	Grade	Points
ART 111	Intro/Art History	3.000	3.000	A	12.000
CHEM 121	General Chemistry I	3.000	3.000	B	9.000
CHEM 121L	General Chemistry I Laboratory	1.000	1.000	A	4.000
ENGL 120	College Composition II	3.000	3.000	B	9.000
HMSIS 111	Wellness	3.000	3.000	B	9.000
PSYC 111	Introduction To Psychology	3.000	3.000	B	9.000

2014 Summer

Program: Pharmaceutical Sciences
Plan: Pre-Pharmacy

Course	Description	Attempted	Earned	Grade	Points
CHEM 122	General Chemistry II	3.000	0.000	D	0.000
CHEM 122L	Repeat Excluded General Chemistry II Laboratory	1.000	1.000	A	4.000
PHYS 211	College Physics I	3.000	0.000	W	0.000

Term GPA: 4.000
Cum GPA: 3.228
Special GPA: 3.028
Special GPA: 3.028
Special GPA: 0.000

Term Totals: 4.000
Cum Totals: 40.000

Inst GPA excluding Transfer Cr
Total Cum GPA incl Transfer Cr
Transfer GPA

Attempted 4.000
Earned 1.000
37.000

GPA Units 1.000
31.000

Points 4.000
100.000

Academic Standing: Academic Warning

2014 Fall

Program: Pharmaceutical Sciences
Plan: Pre-Pharmacy

Course	Description	Attempted	Earned	Grade	Points
BIOL 220	Human Anat & Physiology I	3.000	3.000	A	12.000
BIOL 220L	Human Anat & Physiol I Lab	1.000	1.000	A	4.000
COMM 216	Intercultural Communication	3.000	3.000	B	9.000
MATH 146	Applied Calculus I	4.000	0.000	W	0.000
PHYS 110L	Introductory Astronomy Lab	1.000	1.000	A	4.000

Term GPA: 3.825
Cum GPA: 3.308
Special GPA: 3.143
Special GPA: 3.143
Special GPA: 0.000

Term Totals: 8.000
Cum Totals: 48.000

Inst GPA excluding Transfer Cr
Total Cum GPA incl Transfer Cr
Transfer GPA

Attempted 8.000
Earned 8.000
45.000

GPA Units 8.000
39.000

Points 29.000
129.000

2015 Spring

Program: Pharmaceutical Sciences
Plan: Pre-Pharmacy

Course	Description	Attempted	Earned	Grade	Points
BIOL 221	Human Anat & Physiology II	3.000	3.000	B	9.000
BIOL 221L	Human Anatomy & Physiol II Lab	1.000	1.000	A	4.000
CHEM 122	General Chemistry II	3.000	3.000	A	12.000
MICR 202	Introductory Microbiology	2.000	2.000	A	8.000
PHRM 125	Medical Terminology/Health Prof.	1.000	1.000	A	4.000
STAT 330	Introductory Statistics	3.000	3.000	A	12.000

Term GPA: 3.769
Cum GPA: 3.423
Special GPA: 3.423
Special GPA: 3.423
Special GPA: 0.000

Term Totals: 13.000
Cum Totals: 61.000

Inst GPA excluding Transfer Cr
Total Cum GPA incl Transfer Cr
Transfer GPA

Attempted 13.000
Earned 13.000
58.000

GPA Units 13.000
52.000

Points 49.000
178.000

Term Honor: Dean's List

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Figure A5. Sample Pre-pharmacy Unofficial Transcript of Student Off Track