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Running head: SCIENCE STUDENT SUCCESS

GeNiUS: ScIe-NCe AcCeSS for UNde-RePReSeNTe-D

UNiVErSiTY PArTiEs

by Kaitlin S. S. Palmer

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Abstract

The School of Natural Sciences (SNS) houses the biology, marine science, and environmental science, technology, and policy majors which have low retention rates. The Science Student Success (S³) Program was created as a toolbox for first-generation and low socioeconomic college students to receive support and access to the resources they need to help them succeed. Three S³ Program students were interviewed to obtain their viewpoints on what should be done to improve the success and retention of first-generation and low-income SNS students. From an analysis of the students' interviews and the scholarly literature, three factors emerged as important to increase student success: financial assistance, enrichment programs such as time management and career exploration workshops, and attendance at the Teach and Learn Tutoring (TLT) center on campus. Based on the data, it was decided that it is in the students' best interest to require mandatory use of the TLT for their courses. Thus, S³ Program members are now expected to attend 10 hours of sessions per month at the TLT for at least two courses.

¹: Names of people, places, and organizations have been changed to preserve anonymity.

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GeNiUS: ScIe-NCe AcCeSS for UNde-RePReSeNTAtIVE- UNiVErSiTY PARTiEs

As I reach the conclusion of my time here at Oceanview State University (OSU)¹, I have been reflecting on the past nine semesters I have spent here and come to the conclusion that I am more forlorn about not continuing my employment at the Teach and Learn Tutoring Center (TLT), the on-campus, free, tutoring offered by the school, than I am about actually graduating and finishing this chapter of my life. When it came time to start my capstone, my head was swimming with half-ideas about what to do. Then, one of my supervisors at the TLT brought to me the proposition of the Science Student Success (S³) Program, in a very raw form. The S³ Program is a system for first-generation and socioeconomically disadvantaged college students in the School of Natural Sciences (SNS) -- those students pursuing a Bachelor's of Science in Biology, Marine Science, and Environmental Science, Technology, and Policy -- to graduate in four years, guaranteed, through providing various academic and personal success resources. During the Fall 2018 semester, the program is being piloted and getting the "kinks" worked out so it will be fully operational by the Spring 2019 semester. Students enrolled in the S³ Program are expected to attend one weekly, one-hour skill session in either content or personal success, rotating on a biweekly basis. Dr. S. Ashland or I would prepare a content-based skill session, and C. Gonzales, the other member of the S³ Program's faculty would prepare a personal success workshop on the alternating week(s).

This is personally meaningful to me for several reasons, including first and foremost that *I am* a first-generation college student. I, first-hand, am aware of many of the challenges first-generation students face. For this reason, I am happy that even after I graduate and my work at the TLT is complete, I will still have a lasting impact on the students here at OSU. I spent four and a half years at OSU and three years at the TLT. Every semester I was a student, I was involved in the course I tutor, CHEM 109 (Introductory Chemistry), be it as a student, an instructional student assistant (ISA), a grader, or tutor. Over the years, CHEM 109 really became more than a job or a course to me, it took a firm seat in my heart as a passion I would look forward to every semester. Though I was not the instructor, every semester I was involved I grew and gained valuable knowledge for my future career goal of being a high school chemistry teacher.

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The material remained relatively the same, though the order of concepts was moved around semester to semester, therefore I got to learn how to teach the same concept nine times, nine different ways. This is really going to be influential when I get into my own classroom, teaching chemistry at the high school level. The TLT allowed me to grow as a student and future educator perhaps more than I actually helped other students in my tutoring practice.

For the S³ Program, the reason CHEM 109 is so important is that it is the beginning point for our SNS students. Thought it is just an “introductory” course, I have been arguing for years that it is, in fact, one of the most challenging courses for any SNS student or STEM major because it contains the foundation of math and chemistry content. Students come into CHEM 109 with various backgrounds with chemistry from high school that can be beneficial or not. For students who do not have a strong background from high school, CHEM 109 is their true introduction to chemistry, cramming a years’ worth of material into seventeen weeks. Though each major is different, many SNS students must complete the “chemistry series” consisting of CHEM 109 and then continue to CHEM 110 and 111, which are General Chemistry I & II, to even get into their biology courses (BIO 210 and 211). All students enter CHEM 109 with a variety of backgrounds and content based on their experience in previous formal (and informal) schooling that we (as course support) have to adapt to in order to be assured we are supporting our students to the fullest capability.

Literature Review

What is the issue?

First generation and low socioeconomic undergraduate students in the School of Natural Sciences (SNS) at Oceanview State University show a large decline in success due to a lack of support. This leads to a lack of retention within the SNS majors. The retention of students in SNS majors is not a challenge *exclusive* to first-generation and socioeconomically disadvantaged students, because the field of study itself encompasses its own struggles with retention. Frost, et al. (2018) stated that in a six-year study conducted by the U.S. Department of Education that across 1,600 institutions nationwide, students in STEM programs persist in the major a mere 51.7% of the time

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while 20.2% drop out of school, and 28.1% switch to a degree program outside of STEM. The failure of the course puts them into poor standing with financial aid, and then they have to pick up extra work to fund their academics and, again, are in the same situation where they do not have enough time to dedicate to their academics.

Specific to our demographic of first-generation students, a term defined to describe a student that had neither parent receive a bachelor's degree, face many challenges including simply adjusting to university life. Katreovich and Aruguete (2017) concluded that first-generation students scored one letter grade lower, as well as had less time and energy for school and less connection to faculty, than their peers who were not first-generation students. They go on to address that first-generation students specifically have less time and energy for their academics because of their work and *family* responsibilities. Family responsibilities are culture-dependent, and while African American, Hispanic, and Native American students consistently attend higher education at lower rates than white, higher-income students, the factor of race is minorly considered in this project (Pitre and Pitre, 2009). Besides first-generation students, the socioeconomically disadvantaged population of students experience similar challenges. Morales (2014) argues that with a better understanding of the student's individual educational resilience, college faculty can better serve this population. This "resilience theory," as it has been dubbed, involves examining low socioeconomic status students who were successful in their uphill battle for their education and using that information to decipher how best to help other students in similar circumstances (Morales, 2014).

Why is it an issue?

First-generation students and socioeconomically disadvantaged students are the populations with the greatest achievement gap, especially in the STEM fields. Financing a college education is challenging for first-generation students because they lack the financial knowledge and resources that their non-first generation colleagues have (Bers & Schuetz, 2014). In addition, many first-generation students have to work full time while attending classes because of loans or a family dependence on their income; this employment can interfere largely with the student's engagement in school and ultimately lead them to leave college because they cannot financially support themselves

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(Falcon, 2014). Morales (2010) draws many connections with the achievement gap between students of color, and not, as well as socioeconomically advantaged and disadvantaged. One of the biggest contributors being a fear/feeling of “betraying” their race and/or class. A large source of support counteracting this, however, was some form of school personnel, most commonly a school counselor advising the students. Due to these challenges first-generation students experience, only 11% of this demographic usually end up earning a bachelor’s degree after six or more years of instruction, compared to 55% of students who are not first-generation, as stated by a 2011 study referenced in Katreovich & Aruguete’s (2017) article.

First-generation students are at a distinct disadvantage according to Onoye and Bong’s (2018) study on low-income engineering technology students. They cite congressional findings that:

As the Nation’s population becomes more diverse, it is important that the educational and training needs of all Americans are met; underrepresentation of minorities in science and technological fields diminishes our Nation’s competitiveness by impairing the quantity of well-prepared scientists, engineers, and technical experts in these fields (Onoye & Bong, 2018, p. 26).

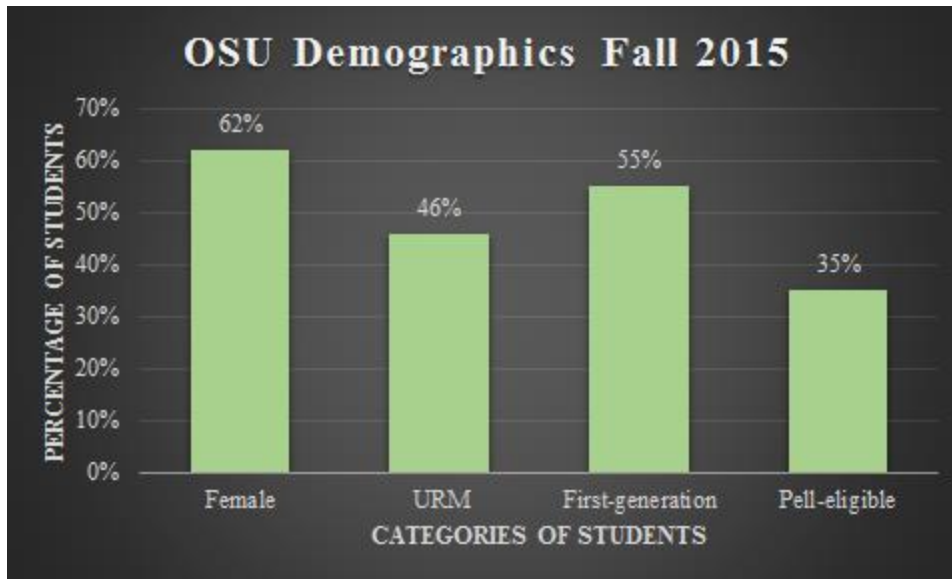
While Onoye and Bong focus on engineering technology students, this argument of discrepancies in diversity is a very valid point. They cite a statistic that upwards of 40% of undergraduate engineering and technology students leave these programs, disproportionately so amongst women and minorities too (Onoye & Bong, 2018). This can be related to OSU’s demographics which, in the Fall 2015 semester, undergraduate enrollment was 62% female, 46% underrepresented minorities (URM) (including Latinx, African-American, Native American, and Alaskan Native), and 55% first-generation (Institutional Assessment and Research, 2016). Low-income students (referenced as Pell-eligible in the figure) comprise 35% of OSU’s Fall 2015 enrolled population and they have made-up approximately one-third of our population for the past six years (Institutional Assessment and Research, 2016). Interestingly enough, also about 30-35% of OSU’s enrolled population are from the tri-county area (Institutional Assessment and Research, 2016). These percentages are represented in Figure 1 below.

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Figure 1.

OSU Demographics Fall 2015



Note: Data from Institutional Assessment and Research, author-created graph. URM represents the “Underrepresented Minorities” and Pell-eligible describes low-income students, language was altered for uniformity.

Morales (2014) “Resilience Theory” also explains a common reason why this demographic of students (socioeconomically disadvantaged) likely falls into the category of obtaining lower levels of success. In their study, the broad results suggest building a student’s self-efficacy and encouraging help-seeking tendencies to increase low-income students’ levels of success. This is important because this subset of students do not reach out and utilize resources for a variety of reasons including their cultural background of asking for help, and/or because they are in a lower socioeconomic class, they are too busy working to survive to ask for help and advance in their academics (Morales, 2014). If it is not necessary for their survival (working to pay for food and shelter), it is not a priority because they are trying to survive and not able to thrive. Onoye and Bong’s (2018) study on the effectiveness of awarding scholarships and/or grants to low-income engineering students did acknowledge that though their results were not a complete solution, their studies did reach some conclusions. Reducing attrition of STEM students was correlated with providing needed access to education (via financial assistance) and enrichment programs for low-income, first-generation, women, and minority students.

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What should be done about it?

Levysohn (2005) addressed support programs and their effect on first-generation students' experiences in a university setting. For those in support programs, Levysohn recounted that the programs were benefiting the students through gaining access to information, as well as forming a social standing amongst their peers. On the opposing side, those students not in support programs expressed feelings of frustration, disconnection from the campus, and stress from lack of resources. We can infer, then, that support programs such as the Educational Opportunity Program (EOP) and College Assistance Migrant Program (CAMP) are marketable benefits to first-generation and low-income students. Similar to the EOP and CAMP programs, at the high school -- and in some cases, junior high school -- level, there is another program, the Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP) which is funded by the Department of Education to assist low-income students to prepare for and enroll in college.

There are precedents in place for student support programs, as voted upon and put into place by the federal government, which lends itself to the importance and effect these kinds of programs can have for students. Pursuant to federal law, an educational opportunity center can provide services including assistance applying for financial assistance, career counseling, and mentorship as well as up to seven more stipulations; however, the point most relevant to the demographic the S³ program is working with is the final point which requires some educational opportunity centers to be specifically designed for students that are from various groups of underrepresentation (Educational Opportunity Centers, 2008). The statute goes on to require for the application of an educational opportunity center to be approved that it, minimally needs to have assurances that two-thirds of the population being served are either individuals who are low-income and/or first-generation.

The GEAR UP program focused, in part, on increasing resilience -- an increase in intrinsic motivation (Capizzi, 2017). Resilience theory supports a developmental theory of change, meaning that when students are enrolled or engaged in these kinds of educational support and opportunity programs (GEAR UP, EOP, CAMP) that supply first-generation and/or low-income students with support and opportunities promote

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successful learning and healthy development (Capizzi, 2017, p.6). In diving into resilience theory, four popular categories contributing to the theoretical foundation of resilience theory are: 1) risk factors which are the roadblocks to academic success, 2) protective factors which are the direct response to mitigating risk factors, 3) vulnerability areas are manifestations of risk, and 4) compensatory strategies which mitigate vulnerability areas (Morales, 2010). Resilience theory, then, is one theoretical framework that can be taken into account for programmatic creation and assessment.

Mentioned earlier was the fear in students of “betraying” their race/socioeconomic class for academic improvement, Morales (2010) also cited parental expectations as a protective factor for low-income students. Morales cited one student’s personal recollection of their mother putting in the work to find a better school for her child than the neighborhood one they called “Convict High,” for reasons one can assume why (Morale, 2010, p.169-170). This additional work put in by the parent, underlines one of the direct effects needed for our low-income, first-generation population. It symbolizes the injustices students face based on their zip code (and, subsequently, their income level), and demonstrates the need for additional effort to be put into place because these are the students who need it the most.

Methods

The S³ Program seeks to support the retention and success of first-generation and socioeconomically disadvantaged SNS students. First-generation students come to university more unprepared than their non-first generation peers for a variety of reasons, including lack of access to support services and a lack of connection or sense of belonging to the campus. This leads first-generation students to drop out before completing their degree. Due to this, the researcher went directly to the students to achieve greater clarity of the issue(s) by conducting interviews. Students were invited to a group interview that was intended to be seen as more of a discussion than an interview. The researcher then transcribed the interviews to analyze the qualitative data for emergent themes.

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Context

This project was conducted upon the Oceanview State University ¹ (OSU) campus in beautiful Oceanview ¹. This area is a developing town as Oceanview State University's population grows. OSU is characterized as a Hispanic-serving institution yet the Latinx population is barely a majority of the population in recent statistics (41% as of Fall 2017). Almost 38% of the total enrollment is comprised of students from the surrounding tri-county area, therefore, there is a large commuter population. Separate from this, approximately 72% of the total student population receives some form of financial aid. Another large demographic observed at OSU is of first-generation students, comprising over half of the student population in the Fall 2017 semester. This is an important statistic because this is largely the population we are seeking to serve in this project. The campus of the university has a rich history which still holds importance today. The institution used to be an army base in the early 20th century, before being converted to an institution of higher learning in 1994. It is a much larger campus than the campus' design leads students to believe because of the amount of land bought from the government, versus how much land is observably utilized.

The past twenty-four years, the campus has seen many changes, and even in my mere four and a half years here, I have too. There is an on-campus tutoring center known as the Teach and Learn Tutors (TLT) ¹ where I worked from August 2015 to December 2018 that has experienced many systemic changes in the structure and design. The TLT is at the forefront of my part of the S³ program because students enrolled in the program are held to various requirements, including mandatory attendance to TLT sessions. For context, the TLT has diverse offerings for content and academic support. Specifically, in the science department, there are two main categories of support: drop-in and peer-led undergraduate studies (PLUS), the latter being a deviated version of the Supplemental Instruction (SI) model on the University of Missouri Kansas City (UMKC) campus. On the UMKC campus, supplemental instruction was borne to combat historically-difficult classes with high fail-rates. The philosophy remains much the same on the OSU campus but there are a few minor differences. For example, at UMKC, SI Leaders host office hours like a professor would, but on-campus, this is not practiced. The PLUS program is for challenging courses and

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relies on the tutor creating a weekly session plan, in collaborating with TLT professional staff and the instructor on showing learning strategies to communicate the most challenging concepts introduced and talked about that week. The last few years the science coordinators have collected information and run statistical analyses showing a correlation between attending TLT sessions and academic success in the course, which is why it is a mandatory requirement for those enrolled in the S³ program.

Participants and Participant Selection

From the forty students emailed, eleven responded and were invited to participate in an interview, from that, only three students were actually interviewed. They ranged in age from 17 to 18 and were all first-year students at the university. However, one of the participants were at sophomore-level because he was dual-enrolled at his high school and local community college to earn credits. Two of the participants were female while one was male. The largest racial demographics of the students was Hispanic or Latino comprising 67% of the interviewees and 60% of the total enrollment in the program. Other races are represented, as well, including about 10% of those in the S³ program classified themselves as African-American, 13% classified as some form of Asian or Pacific Islander, and 24% classified in whole or part as Caucasian or white.

J. Nelson. A seventeen-year-old first-generation African-American female student in the S³ Program. At the time of the interview, she worked off-campus and lived on-campus.

Y. Torrance. An eighteen-year-old first-generation Mexican female student in the S³ Program. At the time of the interview, she was looking for a job and lived on-campus.

A. Franco. An eighteen-year-old first-generation Mexican male student in the S³ Program. He does not work and lived on-campus.

Researcher

This concern and project are personally meaningful to myself, the researcher because I spent my time at OSU helping students in my job at the TLT; I wanted to have a lasting impact on the students that I have yet to meet. For the three years (really my

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full time at OSU), I have been deeply involved in facilitating student success in the CHEM 109 course. Dr. S. Ashland is my direct supervisor for this project and during the past three and a half years, we have built a professional relationship that I feel would be to the benefit of my future career success. When she brought this program to my attention, a program meant to support SNS students to graduate in four years when it is normally, easily, a four and a half year program if one is being *strict*, I had to jump on it. CHEM 109 is the starting point for many SNS students and their foundation will set them up to succeed or fail depending on the instruction and support they receive. Separate from this, I, too, am a first-generation college student and having someone, or multiple someones in your corner supporting you, would be very helpful for an individual with no experience with how college works.

Coming into this project, I feel I have a lot of background knowledge and experiences working with and helping students at the introductory chemistry level, which is the stepping stone for this program. I have learned many different ways of how to explain the same concept or problem to adapt to many different students and learning styles. This, though, is a superficial extension of my experiences to this project. Being in this role though, I have seen and learned from many different students and as such am better able to predict challenges and create solutions to implement quickly. Separate from that I have a working knowledge of the biology (B.S.) major course pathways despite not being in the major, and I have a tight-knit network of connections of faculty and staff throughout all levels of the STEM students' academic pathway. This is helpful when I would interact with students because I can answer questions for them from a students' perspective. It helped to keep me relatable to them.

As far as biases, intentional and not, I recognize that I do have the positionality of coming from a white, lower-middle-class family with racist ideals growing up. Since entering OSU, I have begun tackling these racist positions and instead turn it back to my parent(s) to question why they feel the way they do. I plan to try and account for these unintentional biases by myself and with my faculty mentor and peers. I want to be sure the language and procedure of the project are held to the proper academic register, but also relevant to the demographics of people we are looking to serve.

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Semi-Structured Interview and Survey Questions

The following questions were asked to small groups of students part of the S³ program.

Introductory statement:

Hello everyone, my name is Katie Palmer, and I would like to thank you all for taking the time out of your day to be here to help me with my capstone. My capstone project is creating and developing an academic and career success program which you all know as the Science Student Success (S³) program. I am going to ask you all a few questions relating to success and retention of students in the School of Natural Sciences (SNS), the school or department on campus your majors are housed under. Your answers are confidential and there is no risk to any of you for speaking so please, be open and brutally honest. I have defined some terms on the board before we begin, let me know if any of you have any questions or concerns about what is being asked of you. As well, if any of you want to leave or need to excuse yourself at any point in time, please do so.

TERMS

Success: a favorable or desired income, success can also be a subjective, personal definition. Can be academic, career, personal or family-related. Can be characterized by happiness as well as attaining or reaching a goal.

Retention: returning to school the following academic year leading, ultimately, to graduation.

First-generation: a student who had neither parent's or legal guardian attend a institute of higher education

Low socioeconomic status: individuals who have financial struggles or burdens as well as lack of access to necessary but usually inadequate public resources

1. What are you concerned about when it comes to retention and success of first-generation and low socioeconomic students in SNS majors?
2. What do you know or think is currently being done to improve retention and success of students in SNS majors - by whom - and do you think this is good, bad, or indifferent? Why?
3. What do you think should be done to increase the success of students in SNS

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majors?

4. What do you think are the challenges to increasing retention and success of students in SNS majors?
5. Is there anything else that you would like to say about retention of students in STEM and/or the improvement of increasing retention of first-generation and low socioeconomic status students in STEM majors?
6. What role does living on campus (or not) contribute to SNS student's success?
7. What role does holding a job (or not) have on SNS student's success?
8. What is your perception of the TLT, the on-campus tutoring center?

Procedure

From the total population of the S³ Program, the researcher identified about forty students that they invited by email for a group interview. The researcher categorized the students into four groups based on questions to be asked in the interview. The information for this was collected from the students' initial enrollment in the S³ Program through a Google Form. Students wishing to join the S³ Program were asked to provide their contact information, major, whether they were living on or off-campus, their current employment status, why they were wanting to join the program as well as what they hoped to gain from it, academically and personally, the last section addressed whether they were first-generation students and if they experienced any barriers to academic success, which they were asked to describe. The four groups the researcher categorized students under were: 1) students who live on-campus and have a job; 2) students who live off-campus and have a job; 3) students who live on-campus, do not have a job, and identify as first-generation; 4) students who live off-campus, do not have a job, and identify as first-generation. Due to wanting a diverse interview group, the participants in the interview were not separated by these categories and were mixed together based on their schedules aligning with the researcher.

The participants were instructed when they were initially contacted that their names and personal information would be anonymous and if they did not feel comfortable with any questions, that they could excuse themselves. The researcher did state that this interview contained no risk for the students who participated. On the day

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of the interview, when the participants arrived, this was explained again and they were given a paper asking for their informed consent as well as some more demographic information, which can be found in Appendix A. The participants consent was further confirmed on the video recording after the physical paper was signed and any questions were addressed. The participants were not compensated for their participation beyond the researcher's gratitude, describing that the extension of the activity would be more the S³ Program's benefit and light snacks in the form of granola bars.

Data Analysis

Transcribed interviews were coded and analyzed for emergent themes. If you wish to read the full transcriptions, the interviews can be found under Appendix B.

Results

For this Capstone Project, three first-year, first-generation students in the School of Natural Sciences (SNS) were interviewed to see what they think could be done to improve the success and retention of first-generation and socioeconomically disadvantaged SNS students. The participants who were interviewed were also members of the Science Student Success (S³) Program. This is important because due to the lack of support and resources, only 11% of first-generation students in STEM programs graduate with a degree after six years of instruction (Institutional Assessment and Research). Students who have had at least one parent attend an institution of higher learning and receive a bachelor's degree or higher, referred to as a "continuing-education" student, however, have a much higher rate of graduation at 55% in STEM programs after six years of instruction.

Based on an analysis of the data and the relevant research of the literature, three themes emerged (see Table 1). Evidence-based decision making required evaluating each potential Action Option by the following criteria: financial cost; time cost; and the effect on student success. The costs (whether financial or time) are important to consider because some solutions are more cost-effective than others while the last criteria, the effect on student success, directly goes back to the outcomes we wish to address including increasing success and retention of SNS students. Based on the

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evaluation of each Action Option an action will be recommended and justified. The financial cost was further broken down to compare the financial cost to the student and the institution. The time cost can also be described as the student's expected time commitment to fulfill that option.

The Science Student Success (S³) Program is an educational opportunity program similar to the Educational Opportunity Program (EOP) or TRIO Student Support Services (SSS) that are offered at Oceanview State University (OSU). As such, the S³ Program, in general, is an answer to the issue of increasing success and retention of first-generation and low-income students in the School of Natural Sciences (SNS). The three options discussed below are options that could be housed under the S³ Program as tenets of the program and the recommendation is the option found to be most influential.

Table 1.

Evaluation of Action Options

	Financial Cost (to student+ institution)		Time Cost	Effect on Student Success
Mandatory TLT attendance	\$0	\$2,535+ per tutor	Medium	High
Mandatory enrichment activities	\$0 or low cost	Variable, low to high	Low	Medium
Additional financial support	\$0 or low cost	Variable, zero to high	Medium to high	Medium

Mandating TLT Attendance

The on-campus tutoring center, the Teach and Learn Tutors (TLT) is a resource that all students can utilize for free to gain assistance in almost all of their courses. Now, the TLT already supports most to all of the courses an SNS student will take during their academic career; however, as this program grows, it may outgrow the current TLT staff and space. Therefore, for this option, I would encourage a further partnership between the TLT and the S³ Program which would benefit the students. This partnership would

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be made so that the TLT can appropriately staff the science and math tutors and courses that would be in high demand for S³ Students, namely: Introductory Chemistry (CHEM 109); General Chemistry I (CHEM 110); General Chemistry II (CHEM 111); Precalculus (MATH 130); Calculus I (MATH 150); Calculus II (MATH 151); Molecular and Cell Biology and Animal Physiology (BIO 210); and Ecology, Evolution, Biodiversity, and Plants (BIO 211).

Financial Cost.

To the students attending the TLT, there is no financial cost to them beyond their normal tuition and student fees. The only potential cost would be for transportation for students who live off-campus. Being a student at OSU, though, student fees also pay for unlimited use of the local bus lines so this cost could be mitigated in that aspect. For the institution and the TLT as a department, though, there is a financial cost. It is hard to estimate the total cost the TLT incurs per tutor. However, we can estimate this: a science tutor, which has the highest pay rate because of the HSI-STEM (Hispanic Serving Institution - Science, Technology, Engineering, and Mathematics) grant that funds their payment, earns \$13.00 per hour. PLUS Leaders, which is a higher time commitment, are expected to be attending the lecture for the course they are supporting, which is about one and a half to three hours of work a week. Separate from this, if the course they are supporting has a lab or discussion the tutor should be attending this as well, for an average of two to four hours a week. We can estimate this to about six hours in the classroom, per week.

Outside of the classroom, PLUS leaders also complete a weekly session plan which should take about one hour a week. All of this ancillary work, though, would be pointless without actually hosting PLUS sessions and/or drop-in hours for students to come into, to receive tutoring. A PLUS leader could expect to do one to two PLUS sessions a week and one to three hours of drop-in tutoring a week. PLUS sessions are ninety-minute segments so we could estimate up to six hours of tutoring a week, though this is higher than the average. In addition, a tutor could also expect to have about two hours a week meeting with their faculty coordinator and with the instructor of the course they support. With six hours in the classroom, one hour of preparation, two

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hours of meetings, and up to six hours of tutoring a week, a science tutor could have upwards of fifteen hours of work a week.

This does not take into account additional work that tutors might take on, such as grading, because it is funded through a different department. A science tutor can expect to work for about thirteen weeks of the seventeen-week semester because there is neither tutoring the first-week school starts nor the last two weeks of the semester. Also, each semester has a week-long fall or spring break. All in all, at fifteen hours a week for thirteen weeks at an hourly pay rate of \$13/hour, the cost of one science tutor can be estimated at \$2,535. This rough estimate does **not** count any additional training the TLT may provide at the beginning of the semester or in the middle of the semester for mid-semester training.

Time Cost.

For this option, the S³ Program coordinators could mandate students in the program to attend TLT tutoring for ten hours a month for at least two courses. This is a reasonable time commitment that equates to about two hours per week which could easily be accomplished during a weekly PLUS session for their science course(s), drop-in hours for math or science, or one-on-one writing appointments. The ten hours would be cumulative amongst all the courses they attend tutoring.

Effect on Student Success.

All three students interviewed credited the TLT as an excellent resource that contributed and will continue to contribute to their academic success. One of the interviewees, J. Nelson (personal communication, October 30, 2018), said that without the extra support for the TLT she may as well have given up on her math course. Another student, Y. Torrence (personal communication, October 30, 2018), stated that she liked the way the tutors explained concepts and kept everyone in the group tutoring session involved. In addition, through the science coordinator, statistics have been collected, tracked, and analyzed regarding students attending the TLT and their pass rates. Figure 2, below, shows the percentages of first-generation and Pell-eligible (low socioeconomic status) students who passed their courses that they attended the TLT for at least once during the semester. The years denote the academic year the statistics were

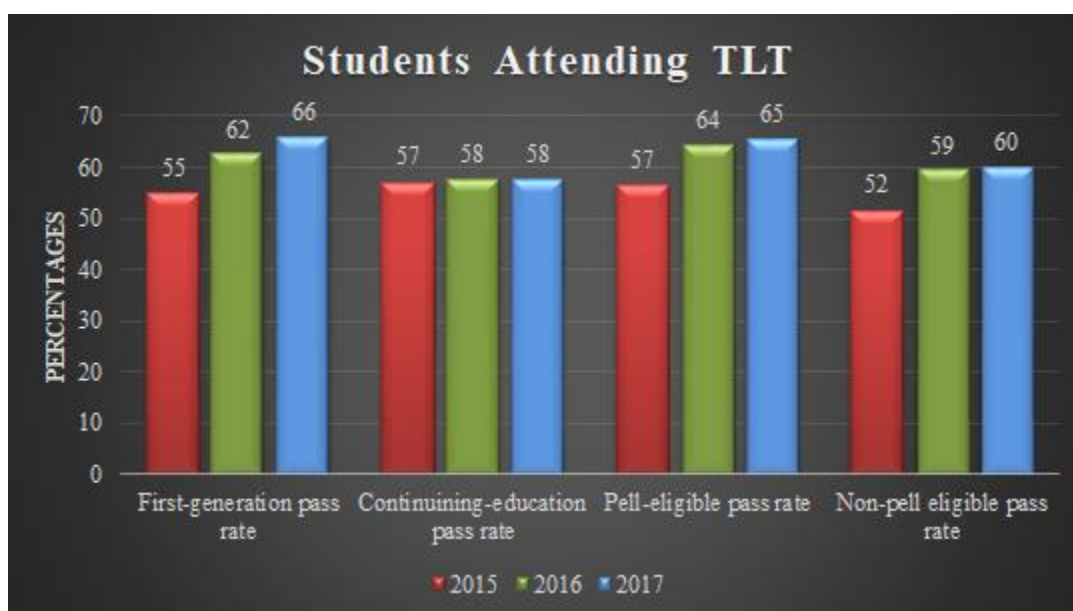
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collected, therefore “2015” is comprised of the Fall 2014 and Spring 2015 semesters. This data is also the sum of attendance from all courses with the “supplemental instruction” (SI) model which is currently limited to select, historically-difficult science courses at OSU. The data for the academic year of 2015 is slightly skewed due to mistakes and inadequacies in the attendance tracking but was included in the data set to show completeness. Based on the figure, first-generation and Pell-eligible students who attended the TLT at least once in the academic year had a higher pass rate in their courses than continuing-education and non-pell eligible students.

Figure 2.

Students Attending TLT



Note. Data from Institutional Assessment and Research, author created graph.

Mandating Required Attendance at Enrichment Activities and Workshops

The university has many different departments on campus that facilitate and foster different facets of student success. These workshops include how to write resumes and other documents needed for acquiring employment, time management and advising, and personal health and well-being. The Growth and Counseling Center¹ (GCC) has many workshops revolving around personal well-being like accepting yourself and stress-management activities. The Center for Student Success¹ has workshops

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relating to a student's academic success with topics on learning styles, note-taking, and test anxiety, to name a few. The Cross Cultural Center¹ (C3) also offers activities and workshops that could help students who a.) may want or need a closer connection with their culture to help them feel included and thus better supported and/or b.) a student who is hoping to learn more about social justice and become more involved. For this option, students would be expected to attend three enrichment workshops per month, one of which cannot be the biweekly skills session during their weekly one-hour meeting with the S³ faculty.

Financial Cost.

Without diverting from the focus topic, the financial cost to the institution for hosting these workshops and other enrichment activities cannot be estimated as they vary widely based on the event; however, students should have zero to minimal cost for attending these workshops. Some departments host large-scale events such as the C3's "All Black Gala" which costs around \$10,000 whereas others are simpler, smaller-scale workshops on how to achieve a certain skill or otherwise improve oneself. This would be simpler to implement because all members of the S³ Program have a specific one-hour time slot planned for each week at the same time and day for skill sessions. The S³ Program itself will be hosting at least two personal success skills workshops that satisfy this requirement but students would be expected to attend one additional workshop outside of these skill sessions.

Time Cost.

Students are already committed to a weekly one-hour meeting as described above that could be used to conduct a workshop. Besides this, students would have to commit to attending 3 success workshops per month, which requires one of them to be outside of S³ time. Overall, this is a time commitment of about 3 hours minimum per month which is reasonable amongst their other commitments. Students could also be encouraged to attend one of OSU's Leadership Conferences which are usually an all-day, eight-hour commitment. If students did attend a leadership conference, it would satisfy their requirements for that month.

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Effect on Student Success.

Students need to have good time management skills, especially students in STEM-related fields, according to one of those interviewed. Y. Torrance (personal communication, October 30, 2018) put a large emphasis on time management and planning being an integral part of a STEM student's path. The research supports this assertion as well, to a degree. Aydin (2017) conducted a research project to correlate personal factors with a college student's success and certain personal factors were slightly significant: "According to the results, classroom communication, including asking questions in a relaxed classroom environment, offering new ideas, and sustaining good relations with peers and faculty members are positively correlated with academic achievement among the personal variables (Aydin, 2017, p.102)." Separate from time management and in-class behavior, participants who were interviewed expressed the desire to have a job in their intended career field. J. Nelson (personal communication, October 30, 2018) said that where she was working at the time was a fine job but if it were a job at the local aquarium, she would enjoy it more because it was in her career field. Several departments on campus do job exploration workshops and host job fairs which could support the students.

Additional Financial Aid Opportunities

All three of the students interviewed mentioned financial assistance being a barrier to student success. Financial aid, however, is not a problem with a simple solution. Both the students and the institution could have a hand in working to solve the issue, though. The S³ Program coordinators could take the initiative and search for and apply to various grants that serve to give financial assistance to first-generation students, low-income students, and students in the STEM fields, as all three of these categories are high-need or at-risk demographics. Looking through The College Grants Database (n.d.), there are many categories of people who can apply for and receive grants based on race, gender, socioeconomic status, and trade (such as medical school). Students can also be encouraged to apply to these various grants, ***in addition to completing their annual Free Application for Federal Student Aid (FAFSA) or California Dream Act*** application for students who are not eligible for the FAFSA

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(undocumented students). The institution could also request additional government funding for the S³ Program with the yearly budget. If the program was able to receive money, it most likely would not be enough to satisfy the financial needs of all the students in the S³ Program so the students would likely have to apply for the additional funding like they would for a scholarship or grant. If additional financial aid could not be acquired, perhaps subsidized housing for students in the S³ Program could be arranged, because housing is usually one of the largest costs besides tuition that students incur. Finally, the third option would be extending the federal work-study program to members of the S³ Program so students can earn an income to cover their day-to-day costs without having to overwork themselves in a full-time position.

Financial Cost.

Financial assistance, is, arguably, a large financial cost because of the cost of attending a university is so high. According to the main web page², 72% of students at OSU receive some form of financial aid but it commonly is not enough. On OSU's website, they have a cost calculator for students to prepare and plan for the total cost of attending the university for a semester. For a California resident and undergraduate student taking more than six units (more than part-time status), tuition and student fees alone total \$3571.50 for a single semester. Living in a triple or quadruple-space residence hall totals \$3525 for a single semester and living in a residence hall requires students to also have a meal plan, the minimum cost being \$2100. With those three numbers, a single semester at OSU can total up to \$9196.50. As mentioned, students do not always receive all the financial aid they need. This pushes students to take out student loans which will take ten to twenty years to pay off after they left university even if they do not graduate, potentially due to financial struggles. It can also push students to get jobs, working full time to cover their school and personal costs which limits the time they can dedicate to their studies.

Time Cost.

It is hard to estimate the time cost to apply to this option due to the various ways this could be manifested. It could be a relatively low time cost where the students just have to commit to applying to various scholarships and grants supplied through the

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university or found in their personal time; however, if the work study option is expanded there is a larger time cost. With federal work study, the student would (hopefully, but not always) apply for and be employed on campus working for a decided number of hours.

Effect on Student Success.

As discussed, because of the high cost of attending an institution of higher education, even a more affordable one like OSU, students tend to pick up employment and/or student loans to persist in the program. Boatman and Long conducted a study on financial aid awards and the impact it may or may not have on student engagement, which echoes this point. They state that students who receive financial aid, usually grant aid, could spend their time engaging with people outside the classroom which could lead to higher course grades and a larger rate of retention if it were not necessary for them to work more hours (Boatman & Long, 2016, p. 654). There is an achievement gap between those socioeconomically advantaged and those not. Students who come from low-income backgrounds work more, study less, are less involved in campus activities and report lower GPAs (Boatman & Long, 2016). Boatman and Long extend this to say that students who spend less time working could have better access to institutional resources such as advisors, faculty, and tutors that could lead to improved academic success and greater involvement in campus activities and various leadership roles/opportunities. Y. Torrance (personal communication, October 30, 2018) had a very firm stance on this as well, from her first survey question she was insistent on finances being one of the biggest struggles to continue earning her degree and the additional stress that is placed on her to succeed. She also echoed an early point that planning, preparation, and prioritization were key to success and not crumbling under stress.

Conclusion

In considering all the options, the quickest, cheapest, and most effective option to mandate as a requirement of the S³ Program is required TLT attendance. The students' testimony speaks to the quality of the program. The TLT is a tutoring center but it is unique in its philosophy and practices, combining traditional tutoring with supplemental instruction, with electronic capabilities. Mandating required attendance

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at enrichment workshops would also be a good choice, and the literature supports it but with not as large an impact on student success. Additional financial assistance would decrease the pressure students have to take on to afford a college degree; however, there is not a simple solution and it would likely have a large time cost trying to gather the money.

Requiring members of the S³ Program to attend TLT session times could have two main negative outcomes, one for the students and one for the institution. For the students, they may not be able to commit to ten hours at the TLT a month because of their personal schedule (including work, clubs, and sports) and potentially lack of session times for the courses they are taking, which is why the staff would have to expand. This leads to the second negative consequence that the TLT budget would have to increase to meet the demands of these students. Despite this, mandating required attendance to the TLT would have the greatest impact on student success and retention. It could also change the campus culture of tutoring as a whole and encourage others to come into the TLT, which could see an overall increase in student academics. This, however, is reaching a bit far, but a definite outcome of continued attendance to the TLT, besides forecasting better grades, would be fostering familiarity. Tutors often see future and past students in the tutoring space as that year's cohort progresses through either the chemistry series of courses or the math series. That familiarity with the students and the tutors can help increase student engagement in the tutoring sessions, as observed from first-hand accounts. The other options would be great ancillary steps to add to the S³ Program but should not be the major part.

Action Documentation and Reflection

Navigating a science, technology, engineering, or mathematics (STEM) university degree can be a challenging path within itself. For first-generation and low-income college students there is an additional set of difficulties factored into that experience. The Science Student Success (S³) Program was born to meet that need. The S³ Program is exclusively for first-generation or low socioeconomic status students in the School of Natural Sciences (SNS) at Oceanview State University (OSU) with the purpose of increasing success and retention. In thinking about what can influence student success,

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I identified potential risk factors from the population of members in the S³ Program. A survey of questions was created to be asked in a group interview.

Single interviews were conducted with three different students in the S³ Program, through which I gained insight into their viewpoint on student success and retention. From the interviews, three main themes emerged that influence student success, attending workshops or training on various professional skills and career exploration, attending the on-campus tutoring center, the Teach and Learn Tutoring (TLT) program, and financial aid assistance. Financial aid is a common hot-button topic when it comes to education, but it is not easily solvable nor is it the most impactful factor. Enrichment programs such as time-management workshops and career exploration activities are more reasonable to apply, but they do not have the largest influence on student's academic success. Therefore, mandating attendance to the TLT was the decision ultimately made; this would require students in the S³ Program to attend ten hours of sessions at the TLT per month, for at least two of their courses. This conclusion was drawn because it was the most cost-effective measure with the greatest effect on a student's success. All three students who were interviewed cited the TLT as an excellent resource and statistics gathered supported this qualitative data, quantitatively.

Separate from the constraints of the capstone project, additional work was done with the S³ Program. All members of the program were required to sign-up for one of three weekly meeting options. Due to scheduling restraints, I was only able to attend one of those three meetings, but they all should be relatively the same. During these weekly meetings, the S³ Program faculty (including myself) would have a short activity planned that was focused on either personal development or content development and study skills. For the first meeting, a brief introduction of the program was presented and a supplementary chemistry content lesson. This was presented and worked on in a lecture hall setting so the information was normally in a Google Slide format. Appendix C contains screenshots from the introductory slideshow presentation. Appendix D is the follow-up presentation that has exam-taking strategies and problem-solving strategies that were applicable to the CHEM 109 concept at the time. After the presentation in Appendix D was presented, Appendix E was given as a worksheet to practice the techniques in first a guided way then for independent practice. One of the success workshops given was centered around fixed versus growth mindsets and time

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management, which can be found under Appendix F. This presentation was preceded with a worksheet on the material discussed, this worksheet can be found under Appendix G.

Overall, this was a whirlwind of a project to be a part of. I came on board in the midst of drafting the basis of the S3 Program which left me conflicted for an amount of time. I knew I was assisting in creating the program and running it but for a while, my faculty partners' vision did not exactly match my own. For the most part, what we had envisioned for the S3 Program correlated well with what the students were wanting to get out of it. We discussed mandates for the program to include attending the TLT, attending various success workshops, and potentially also creating a small book scholarship for students to be able to apply for. The largest unplanned variable was definitely the weekly meetings for the S3 Students because I was unsure of how I fit into that equation, and as such, I only attended a handful of meetings. If I could go back to my first meeting with my faculty mentors, knowing what I do now, I would have stood more firm in trying to outline what the program looks like and my specific place within it. I personally struggle with big-idea projects and am much more successful in creating and completing smaller, more detail-oriented tasks. This is why I had a rocky beginning with the project but through completing it, I learned that I am more than capable of grounding a big-picture concept with realistic steps now.

In completely reflecting on my undergraduate career at OSU, I truly can see how far I have come. I entered OSU as an undeclared, first-generation college student with the intention of pursuing nursing. However, after being enlightened on the nursing program at OSU, I realized that it was not going to fit with my personal education journey. My two freshman-year roommates were both liberal studies majors and, as I was weighing my options, I decided that education would be a good fit for me because it still served my initial purpose: to help others. After attending public education for thirteen years, I was aware of how the system worked on the superficial layer but not the inner workings. Through my coursework at OSU, I learned what it truly means to be an educator.

I attribute mainly four courses as my baseline understanding of education which would be LS 277/s (Schooling in Modern Society); LS 398/s (Social Foundations of Multicultural Education); LS 300 (Major ProSeminar); and LS 400 (Senior Capstone).

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These four courses emphasized the first major learning outcome (MLO) of the Liberal Studies pathway (Developing Educator). In LS 277/s, a course with a service learning component, I began understanding the (in)equity in our (public) schools when it comes to funding. I was pushed to make arguments about equity of education for the students but in a realistic setting where I have to balance a budget, this was really challenging but also deeply engaging for me. In LS 398/s, another course with a service learning component, I continued this conversation of equity but also learned about logistical things a school is involved with as well, such as the School Accountability Report Card (SARC) which is a short informative document about each individual school and the surrounding schools in the district. With LS 398/s I also pursued controversial topics in education such as if the HPV vaccination should be mandatory to attend public schools, in which we wrote a mock letter to the governor. Another topic was if schools should lead the change in social norms or accept them, which sparked a controversial discussion with our whole class. In LS 300 and LS 400, I had a more active role in my learning as I had to find, research, and create some sort of action proposal.

We are in a golden age of technology right now with all the advances in science and technology. As I write this, a new mission has begun on the planet of Mars: InSight, which could ultimately lead to the understanding of how rocky planets (such as Earth) evolve. For more information on InSight's mission, I encourage you to visit Nasa's website: <https://mars.nasa.gov/insight/mission/overview/>. Regardless, in this day and age, we must adapt quickly to continue growing and expanding our understanding and control over life around us. The College of Education at OSU also agrees that it's students should be tech-savvy, as proof by MLO three (Innovative Technology Practitioner). Technology was heavily utilized in all my courses but I feel especially emphasized in LS 383 (Innovative Approaches to Schooling). This course was organized into nine different approaches to schooling and the class was split into groups ranging from three to six students and each group was assigned a different approach. On the groups' own time, they had to research, prepare, and execute a class-length presentation of the innovative approach, using that specific approaches' methods. For example, my group was assigned virtual schooling so one of my group members created a website and we linked all of our resources and activities to the website so it was in as virtual of an approach as we could manage. In this project, I used many applications to create and

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execute my capstone with the Microsoft and Google suites of apps mostly. For some statistical work, I was aided by R and R studio.

Ultimately, everything leads up to the MLO five (Subject Matter Generalist) because that is the brains of the whole college: having the content knowledge to actually pass on and teach. All pedagogical education is next to meaningless if you have nothing to actually teach. All of my courses and course assignments have a direct effect on my extended toolbox of skills, concepts, and practices. My critical action project in LS 300 was a milestone of success and retention of information up until that point, and my critical action project for LS 400 is my final milestone proving my satisfaction of all learning outcomes and attainment of my Bachelor's degree.

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²: Citation not provided to maintain anonymity

References

- Aydin, G. (2017). Personal factors predicting college student success. *Eurasian Journal of Educational Research*, 69, 93-112. doi:
<http://dx.doi.org/10.14689/ejer.2017.69.6>
- Bers, T., & Schuetz, P. (2014). Nearbies: A missing piece of the college completion conundrum. *Community College Review*, 42(3), 167-183.
- Boatman, A. & Long, B. T. (2016). Does financial aid impact college student engagement? Evidence from the Gates Millennium Scholars Program. *Research in Higher Education*, 57, 633-681. doi: 10.1007/s11162-015-9402-y
- Cappizi, L.M., Hofstetter, C.H., Mena, D.D., Ducktor, B., and Hu, X. (2017). Promoting low-incoming students' college readiness, well-being, and success: A GEAR UP counseling program study. *Enriching Student Well-Being and Success*. Retrieved from Eric EBSCOHost.
- College Grants Database. (n.d.). Free college grant money. Retrieved from:
<https://www.collegegrant.net/>
- Educational Opportunity Centers, 20 U.S.C. §1070a-16 (2008).
- Falcon, L. (2014). Breaking down barriers: First-generation college students and college success. *League for Innovation in the Community College*, 10(6). Retrieved from: <https://www.league.org/innovation-showcase/breaking-down-barriers-first-generation-college-students-and-college-success>
- Frost, L., Green, J., Huffman, T., Johnson, B., Kunberger, T., & Goodson, L. (2018) SPARCT: A STEM professional academy to reinvigorate the culture of teaching. *Journal of STEM Education*, 19(1), 62-69. Retrieved from Eric EBSCOHost.

¹: Names of people, places, and organizations have been changed to preserve anonymity.

²: Citation not provided to maintain anonymity

- Institutional Assessment and Research. (2016). Student Statistics. *California State University, Monterey Bay*. Retrieved from: <https://csumb.edu/iar/student-statistics-o>
- Katrevich, A.V. & Aruguete, M.S. (2017) Recognizing challenges and predicting success in first-generation university students. *Journal of STEM Education*, 18(2), 40-44. Retrieved from Eric EBSCOHost.
- Levysohn, J. D. (2005). Promoting first-generation college student success: Establish a connection, eliminate confusion and build confidence. *Capstone Projects and Theses*.
- Morales, E.E. (2014). Learning from success: How original research on academic resilience informs what college faculty can do to increase the retention of low socioeconomic status students. *International Journal of Higher Education*, 3(4). doi: 10.5430/ijhe.v3n3p92
- Morales, E.E. (2010) Linking strengths: Identifying and exploring protective factor clusters in academically resilient low-socioeconomic urban students of color. *Roeper Review*, 32(164-175). doi: 10.1080/02783193.2010.485302
- NASA. (n.d.). InSight mission overview. *NASA: Mars InSight Mission*. Retrieved from: <https://mars.nasa.gov/insight/mission/overview/>
- Onoye, L. C. & Bong, S. (2018). The study of the effectiveness of scholarship grant program on low-income engineering technology students. *Journal of STEM Education*, 18(5) 26-31. Retrieved from: Eric EBSCOHost.
- Pitre, C. C., & Pitre, P. (2009). Increasing underrepresented high school students' college transitions and achievements. *NASSP Bulletin*, 93(2), 96-110.

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²: Citation not provided to maintain anonymity

Appendix A

Demographic Information

All information will be confidential.

Name: _____ Age: _____ Gender: _____ Class Standing: _____

Are you a first-time freshman or a transfer? First-time freshman Transfer student

Are you from the tri-state area? (Redacted) Yes No

Are you currently working? Yes, off-campus Yes, on-campus No I am still looking

Do you wish for a copy of the recording and/or final paper this is working towards? Yes No

Have you attended the CLC before today? Yes No

Consent Form

Participants will be interviewed. All interviews will be done in small groups. When it is not possible to interview participants in person, they will be invited to complete a phone interview or paper and pencil survey of the same questions. Face-to-Face interviews will take less than one hour, be audio-recorded (with participant consent), and take place in the Library. A semi-structured interview format will be used for face-to-face interviews, to allow for follow-up questions to unclear, interesting or unexpected responses. All interviews/surveys will be scheduled at the convenience of the interviewee and should take approximately 30-45 minutes to complete.

There is less than minimal risks associated with participation in this study. Participants may, however, feel uncomfortable sharing their opinions.

INITIAL: _____

All volunteer participants will choose whether or not to participate in this research project. Should they choose to participate, they will still have a choice not to answer any questions they are uncomfortable with. For the in-depth interviews, I will assure them that all names will be changed to protect anonymity. Additionally, all interviews will take place in a comfortable manner and in a relaxing situation, where interruptions and distractions are minimized.

INITIAL: _____

Transcribed interviews will be analyzed for emergent themes.

INITIAL: _____

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Appendix B

What follows are the transcribed interviews that were conducted. For the first interview with J. Nelson, due to a recording error, only the last three questions were recorded.

Interview 1. J. Nelson

6. What role does living on campus (or not) contribute to SNS student's success?

Living on campus, I feel if you live on campus you get the most support and are more in tune to what's going on around you. You're more involved. Living off campus, sure you're still going to school but like if you're not on campus you might not want to come back to campus for like tutoring or something. You may not want to, it might be too much of a hassle. When you're on campus you're already there getting support. Like how I live in the women in science floor, I found people who are majoring in the same thing as me so it's nice to get that same feeling and I come here for tutoring which is nice. I don't know, I feel on campus you get the support you need. It's more acceptable, you'll be more involved for like events here

7. What role does holding a job (or not) have on SNS student's success?

Not having a job I right now I feel fine, I'm not feeling stressed but I don't know because I want to feel involved in my career so that's the only thing but I'm more relaxed and less stressed right now. My success is, I guess, going fine. But if I did have a job I know I'm going to have to be involved more in time management which will help my career goals in a way. But like if I was working at the aquarium or something it would more help my career goals because like I am interested in my current job but I'd be more interested in like developing something that can connect with my future career goals and it will improve my success more because I am way more interested. I'm a little interested in my classes now but I don't know, you could connect more.

8. What is your perception of the TLT, the on-campus tutoring center?

So the TLT is a great program, tutoring center. For one it is free. Well kind of. Something that is on campus and you don't have to go off campus because off campus is less accessible. They offer practically all the classes you're taking, upper division classes too. The tutors are always nice and they have taken the same classes as you. I think having that extra support like for my classes without

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it I think I would have given up on my math class. Like I have to come back for my math homework. I just took a math exam and I think I did good but I'm not sure. But for my exams for chemistry the TLT reassures me on things I didn't understand I know I did good on my exams like I felt good like when taking the exam and I did good in the end so going to the TLT helps and I am glad I have the program here. Because I know I probably wouldn't be doing as good as I am because I feel everyone needs support no matter how smart you are because you are still learning new things every day.

Interview 2. Y. Torrance

1. What are you concerned about when it comes to retention and success of first-generation and low socioeconomic students in SNS majors?

Um, I think for me personally it is the financial aspect of it like how college is so expensive and sometimes you don't get financial aid and that's when you're like what do I do like I didn't get financial aid and school is so expensive like okay scholarships and stuff but sometimes you don't get them like it is so much extra stress and it's like on you because it's like I have to do good in these classes because I am actually paying for these classes and paying so much. So for me like I went to public school all my life which is free and this is something completely different where I am paying so much more per semester and then it's like okay I have this pressure just to succeed in my classes and do well academically so I feel like I have that bigger pressure because financial wise. It's like we are kind of paying, there is no financial assistance and that's what mainly concerns me, like not being able to afford all of it, all four years, or maybe like you have to take a break because of that you can't afford it and like you're like okay I am going to take two years off and you work two years and then go back to school but then that's a long process and sometimes you don't do as great as you would in all four years at once because like you forget or I would forget everything because I have a very bad memory.

2. What do you know or think is currently being done to improve retention and success of students in SNS majors - by whom - and do you think this is good, bad, or indifferent? Why?

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I know about the TLT and I think that's really good and helpful. I have been to the TLT a lot multiple times already and it has been super helpful. I have been to the PLUS sessions with Cecilia¹ she really helps me understand the subject and what we are learning in class she is a great tutor. Also Dr. Ashland in class like if you need help you raise your hand and she comes over or she tries to because there are so many students. And she explains things if you don't understand it which is a great help. I haven't been to Dr. Ashland's office hours but I know that she has her office hours and she offers help. Actually my roommate went to her and got a lot of help for her exam. Dr. Ashland cleared up some stuff that confused about and she did pretty well on the exam actually because she went to Dr. Ashland. I also know about the S3 program. So far we did test corrections for the first midterm which helped and helps you succeed because you're doing test correction so you know what you did wrong and they explain okay so this is what you did and this is how you improve and like we are gonna guide you to correct answers so I think that really helps. Um I also know there's a TRIO stem program I don't know that much info, information, I'm not in that program but I know they also help you in the science majors. So yeah I think they are all pretty good. All the programs. I think the TLT has helped me the most so far. The drop in and the PLUS sessions help so much, I cannot stress that enough. Like in the beginning of the school year I was not good at chemistry. Going into chemistry I was like ugh I'm not gonna do good because I didn't do well in high school my sophomore year in high school I got like a bad grade in chemistry so I'm like ugh I'm gonna get a bad grade again but then I went to the TLT and into a study PLUS session and now I'm doing really well in chemistry and that makes me happy. I proved myself wrong so I feel so happy. The programs are really good.

3. What do you think should be done to increase success of students in SNS majors? Personally I would like smaller class sizes. The lecture classes especially because I don't do well in those class environments I can't concentrate at all. I get distracted. I play on my phone and talk to my friends. It is easier to get distracted because the teacher, there's so many students she can't focus on everyone but like the discussion classes with like 25-30 people she knows who you are and she knows if you aren't like paying attention so like yeah smaller class sizes but I

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know its hard when there a lot of students and it's like chemistry and not enough teachers. But yeah I think that's the only thing I would do because in smaller class sizes you can concentrate more, or well I can concentrate more because I work better in those environments with smaller students. I think also in math we have saturday workshops and those are pretty good too. There's tutors and they like help you if you need help.

4. What do you think are the challenges to increasing retention and success of students in SNS majors?

I would say maybe students like lose confidence in themselves. The classes get harder and sometimes students don't have like good time management skills and they try to like do everything at once and you can't really do that you have to like separate your tasks do one task at a time, you can't do them all at once or you're gonna crash down. I think that is one of the challenges, also like students overworking themselves and procrastinating on their work and they don't do as good as if they had everything planned out. Um I think those are like the challenges. Maybe lack of self confidence in a way too, because like getting like a bad grade on a test or quiz and I feel like I did bad and I start thinking of the worst scenarios and it's a snowball effect. Like I did bad on this test, next one, then fail the whole class, it's a bad thinking habit

5. Is there anything else that you would like to say about retention of students in STEM and/or the improvement of increasing retention of first-generation and low socioeconomic status students in STEM majors?

I don't think so. I'll say if you're in a stem major you really have to believe in yourself and that's for any major but for a stem major you have to plan things out more so you don't stress yourself out because the classes are more challenging compared to someone like liberal studies like you're gonna get more math and science that's what your major is all about those classes can get really hard so you really need to plan it out and prioritize like okay I'm gonna study and study and not going out with friends and I feel like that's what you have to do and people don't wanna do that but you have to if you wanna succeed and I feel people don't get that. So yeah plan everything out and don't procrastinate because otherwise it is going to turn bad

6. What role does living on campus (or not) contribute to SNS student's success?

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I think it's a great thing. Living on campus really helps you. Like everything is close to you, you can get to your classes on time and if you wanna talk to your professors in their office hours you can just go you don't have to be like oh I have to go home first then back. It's easier transportation wise and you can go to more workshops and you don't feel as tired at the end of the day. Like if I were to commute, I have a lot of friends who commute and they don't really like, they could do better in their classes and go to the TLT and stuff some are like oh I can't go to the TLT because I have to go home to rest or to make it in time for something else. It's a disadvantage living off campus because you can't access all the resources on campus.

7. What role does holding a job (or not) have on SNS student's success?

I don't have a job but I am looking for a job but if I were to get a job I would only do part time because I feel if you were full time you wouldn't be able to give enough time to your studies and you'll be so tired after working a full shift and not have enough time to study or having to put in those extra hours to succeed in your classes. I mean I like having a job and making my own money and not depending on like my parents so I like having a job but I have to realize okay I can't work full time like you are a student first and have to put your studies first like for me my studies are more important like if I were to work I would just work on the weekends but then you couldn't like work on a project or study for an exam over the weekend. It makes you more independent having a job but you have to be careful with your hours because that can affect how you do in school.

8. What is your perception of the TLT, the on-campus tutoring center?

I think it's great. I've said before it really helps you and I plan to go for like every class but yeah I think it is a great center, great tutors, like I said already I love Cecilia, she knows how to explain things and shows steps and she does it with you and asks questions along the way. The first time I came to the TLT, I didn't feel nervous, I remember it was to double check my answers so I came in and I ended up staying for the drop in hours because they were like explaining homework problems. I liked how everyone got involved. The tutor would ask like okay what do we do next and include everyone. The first day I had Cecilia and I really like how she explained things to me. I didn't feel nervous like "Oh my God I'm dumb"

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I know some students feel like that but not me I saw it as a way to get more help and understand. Dr. Ashland said don't think going to the TLT makes you dumb or anything, it's all to help you succeed.

Interview 3. A. Franco

1. What are you concerned about when it comes to retention and success of first-generation and low socioeconomic students in SNS majors?

I would be concerned whether freshman were understanding, or, I would hope they would have the commitment to stay in school and hopefully there would be resources here to provide a guide or some kind of ideal place after graduation. Success wise there should be resources for students to use to help them get through college and I think that's the most important

2. What do you know or think is currently being done to improve retention and success of students in SNS majors - by whom - and do you think this is good, bad, or indifferent? Why?

The TLT, S3, what other programs? TRIO. I'm gonna talk about S3 because that's the one I am most familiar with. I think it's a very good program. It allows or rather helps students get involved in the natural sciences and stuff

3. What do you think should be done to increase success of students in SNS majors? Of all students... I think having a good support system for any student who needs it is crucial for their success whether it's a difficult subject or just material wise being able to support them. Whether it's material wise when they need a loan or grant for materials or books or the TLT where they get a tutor to help them who understands. So content and materials

4. What do you think are the challenges to increasing retention and success of students in SNS majors?

The challenge would be not having... not knowing all the resources available to students

5. Is there anything else that you would like to say about retention of students in STEM and/or the improvement of increasing retention of first-generation and low socioeconomic status students in STEM majors?

No, nothing

6. What role does living on campus (or not) contribute to SNS student's success?

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I think living on campus allows students to just be on campus which is helpful because of the access and for students who are off campus it can be more difficult because they have to find transportation to the SNS S3 program

7. What role does holding a job (or not) have on SNS student's success?

Another time commitment for the student and hopefully the S3 program would be able to schedule a better time for them

8. What is your perception of the TLT, the on-campus tutoring center?

I think it's a very important resource for students who need the extra help or rather not just that but also to... learn.. Reconfirm what they learned, giving them confidence in what they learned and when they are struggling to help them out

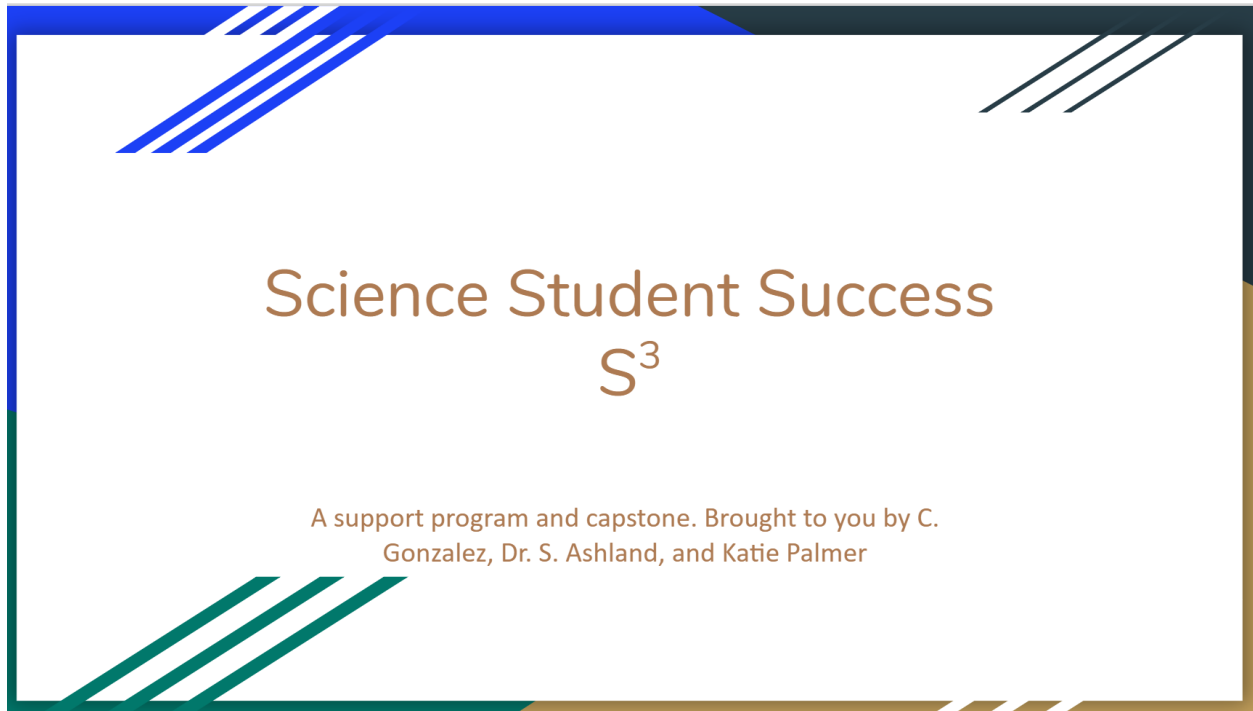
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Appendix C

The full presentation is available here:

<https://docs.google.com/presentation/d/1KVoYyntMwpaRfKsYZyseOBRRipbeAP9OPmMOJHnDoYo/edit?usp=sharing>



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Appendix D

The full presentation is available here:

<https://docs.google.com/presentation/d/12fUaoYN5MC4j23dWTM5-Na5rzoUqAtxPit9Ziv-1JZg/edit?usp=sharing>



Study Skill Session 1

Exam-Taking Strategies



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Appendix E

Writing Chemical Reactions

Example 1: Write the reaction of magnesium phosphate and sodium sulfide

Step 1: Write your reactants as ions

Magnesium Phosphate Sodium Sulfide
 Magnesium = _____ Phosphate = _____ Sodium = _____ Sulfide = _____

(Balance Charges)

Magnesium Phosphate = _____ Sodium Sulfide = _____

(Soluble or Insoluble?)

()

()

Step 2: Write your skeleton reaction

_____ () + _____ () →

Step 3: Predict products (double-displacement) (make sure charges are balanced!!)

(Swap cations) Sodium Phosphate Magnesium Sulfide
 Sodium = _____ Phosphate = _____ Magnesium = _____ Sulfide = _____

(Balance Charges)

Sodium Phosphate = _____ Magnesium Sulfide = _____

(Soluble or Insoluble?)

()

()

Step 4: Fill in the rest of skeleton reaction

_____ () + _____ () → _____ () + _____ ()

Step 5: Balance the reaction

____ _____ () + ____ _____ () → ____ _____ () + ____ _____ ()

Practice With Reactions

Write the molecular and net ionic equation and label what kind(s) of reactions it is.

1.) Sodium hydroxide reacts with sulfuric acid.

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2.) Pure aluminum reacts with potassium phosphate to form aluminum phosphate and pure potassium.

3.) Ammonium sulfate reacts with calcium acetate.

4.) Silver nitrate reacts with sodium chloride.

5.) Liquid octane (C_8H_{18}) reacts with gaseous diatomic oxygen.

Appendix F

The full presentation is available here:

<https://drive.google.com/file/d/1d87ArYe8PethRLz3kLSn13OwH9ATUKUh/view?usp=sharing>

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Fostering a growth mindset

How growth mindsets help us succeed in college by lessening the burden of stress!



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Appendix G

S3 Activity: Growth Mindsets and Time Management (Fall 2018)

Part 1: *Growth Mindsets*

1. Reflect on a time in your past (doesn't have to be in college) where you faced a challenge and how you "made your brain smarter". Write your response below.

(What was the challenge you faced? Was it learning to ride a bike, learning a new language, learning a subject or topic in class? What made it difficult? What steps did you take to overcome that challenge? Did your mindset help you or make things harder? How did or how could a GROWTH MINDSET help you overcome that challenge?)

2. After discussing with your peers, what types of strategies can help overcome difficult challenges? How can your mindset help or impede progress?

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For your convenience, here are 9 steps that can help you develop a growth mindset when facing certain challenges.

9 easy steps to help you adapt a growth mindset

This didn't work out. What's my next step?		
1. What happened?	2. What was your strategy?	3. What were you thinking at the time?
4. What happened when things didn't go as planned?	5. Describe what's been going through your head since then.	6. What have you learned that will help you do better next time?
7. What new strategies can you try or who can ask for help?	8. What's the new plan?	9. How will you deal with thoughts that could keep you from trying?

Part 1: *Time management*

3. Complete the time management assessment on the following pages.

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Time Management: Self-Assessment

Review the suggestions for good time management, and then complete the assignment to evaluate your own skills at managing time.

Time management for students can be one of the most important –and difficult—skills to learn during your college years. With so much going on, having strong time management can sometimes seem impossible. Fortunately, however, there are things you can do to help make sure your time management as a student leaves you feeling organized and in control instead of exhausted and behind.

Time Management

1. **Write everything down.** Have, maintain, and use a planner (or PDA) to indicate when major projects will be due, exams will be given, and events will be held.
 - a. Copy important deadlines (tests, papers due) from your syllabi into your planner.
 - b. Write down deadlines in stages: research, outline, 1st draft, etc.
2. **Put all information into your planner.** Six lists means six pieces of paper to keep track of. One list is easier.
3. **Take a half-hour to plan a day or week at a time, specifically looking at which assignments to do when.** This way, when you have a chunk of good study time, you don't take up the first 20 minutes deciding what to work on.
4. **Make a to-do list for each day the night before or during breakfast.** Review your planner to set yourself for a successful day.
5. **Structure your out-of-class time.** Schedule time to work on specific assignment or lab into a specific time slot, as if it was a class you were planning to attend. Be there on time.
6. **Use small bits of time between classes and meetings effectively.** In fifteen minutes you can review, edit, and revise your notes from a recent lecture. A half-hour is good for beginning a problem set.
7. **Handle each piece of paper once.** Stop shuffling paper from one pile to the next. Make a decision about what to do with the paper and do it. When you take time to read e-mails, respond to them immediately.
8. **Diagnose your procrastination.** Is it really the WHOLE paper you're having trouble starting, or just deciding on a topic? Is it the whole problem set, or just one that has a section you can't understand?
9. **Don't waste time being confused; GET HELP!** If you are stuck on an assignment, use the on-campus resources, such as the Reading Center, ESSC, and Math Lab, to get started. Contact the Academic Support Center to set up semester-long tutoring in many subjects. The services are FREE!
10. **Rome wasn't built in a day; college takes years.** Difficult tasks are meant to be subdivided. Divide your projects into parts.
11. **Build rewards into your schedule.** Four hours of solid studying followed by a half-hour phone call to your best friend is more productive than four hours of study interspersed with phone calls.
12. **Take time for yourself.** Exercise, have fun, have relationships, and sleep. Allow for some flexibility!

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4. Schedule Desired Tasks					
<ul style="list-style-type: none"> ✓ Schedule activity to promote PHYSICAL well-being such walking, biking or other physical activity you enjoy. ✓ Schedule activity to promote EMOTIONAL well-being such as time with family and friends. ✓ Schedule activity to promote MENTAL well-being such as doing something creative, spending time in nature, reading, yoga, listening to music. 					
5. Create Your Days with To-Do-Lists					
<ul style="list-style-type: none"> ✓ Spend the first or last part of each day creating a plan. ✓ Plan for tasks of quality not quantity. ✓ Be realistic about what you can accomplish in a day ✓ Break big tasks into small ones to avoid feelings of overwhelm. ✓ Do ugly tasks first. "Lick your frogs first." ✓ Prioritize lists based on DUE DATES and IMPORTANCE. ✓ Allow time for reflection. 					
Time Management Self-Assessment					
Self-assessment of your study time patterns allows you to explore and evaluate the range of decisions you make each day with regard to time management. Odd numbered items are positive components and even numbered items are negative components. A positive score indicates proactive time management and a negative score indicates room for improvement. Regardless of your score, review the questions and decide where you can improve your skills.					
Do these items reflect you as a student?	No				Yes
1. I keep a careful record of the dates of upcoming major events such as tests and assignments.	1	2	3	4	5
2. I often feel really panicky about being behind with my work.	1	2	3	4	5
3. During a study sessions, I set small goals and work to achieve them (e.g., read 5 pages of text and do three math problems).	1	2	3	4	5
4. I tend to miss classes.	1	2	3	4	5
5. If I need to solve a problem quickly, I get help from another student, the teacher, or other help resources.	1	2	3	4	5
6. I often miscalculate how much time homework tasks will take.	1	2	3	4	5
7. I have set up a regular plan for my study activities.	1	2	3	4	5
8. I find my current course load too heavy.	1	2	3	4	5
9. I begin assignments early so that I will have time to do a good job.	1	2	3	4	5
10. I have difficulty concentrating while doing homework.	1	2	3	4	5
11. I plan ahead so I can be flexible about putting in extra hours if I have a lot of school work to do.	1	2	3	4	5
12. I always seem to be behind with my work.	1	2	3	4	5
13. I regularly use a day planner to plan my activities.	1	2	3	4	5
14. My marks tend to suffer because of last minute cramming for tests.	1	2	3	4	5
15. Each day I have clear goals what I wish to accomplish.	1	2	3	4	5
16. I am easily distracted from school work by my friends, tv, etc.	1	2	3	4	5
17. I really enjoy working on the courses I am taking.	1	2	3	4	5
18. I can only work if I feel like working.	1	2	3	4	5
19. I prioritize tasks effectively.	1	2	3	4	5
20. I have a hard time deciding just what school work I should be doing outside of class.	1	2	3	4	5

Total for the ODD numbers minus the total for the Even numbers = _____

Need help with improving your time management skills? Contact your academic strategist for support!

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