Six Steps to College Success

Learning Strategies for STEM Students

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To Mom and Dad for teaching me about grit.

To colleagues and students who have become dear friends.

—KCS
Acknowledgments

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Foreword: Oscar, Ariel & Tran

The book (and adventure!) you are about to embark on is the same journey I went on to discover how to effectively and efficiently study and prepare for any class, any exam, and any amount of material that needs “digesting.” What you have in your hands is the “cheat sheet” to being successful in your undergraduate studies and even in studies beyond.

It is through these methods that I bypassed the stress others were experiencing during the semester (especially on test days), along with getting the proper amount of sleep.

Using these strategies I developed my personal memory retention technique that I call the “Octopus Method.” The name came to me after going to a seafood market and watching octopi in their tank. If an octopus only had one, two or three tentacles on the ground, it was easily pried up and out the tank. When an octopus had all eight tentacles on the ground, it was much harder for it to be taken. That is how memory works. If you link a new concept to eight other already-known concepts, it will stick and be retained.

By applying the strategies in this book I was able to graduate from college with a high GPA and gain entry into medical school. Get ready to learn how to learn.

Oscar Nguyen

My study habits in high school were good enough to earn decent grades, but far from stellar. I was comfortable with just getting by academically.
Everything changed when I started college. The academic demands were much more challenging. But it wasn’t until I received some very poor grades that I realized I needed to change how I studied.

I attended the Six Steps learning skills seminar the next semester. I learned how important it was to be prepared for class, to read, to make good quality notes, to review, and to self-test. Slowly but steadily, I stepped out of my comfort zone and purged myself of my poor study habits.

I gained an understanding about the importance of time management. I viewed every class assignment as an opportunity to use my newly-acquired study skills. I began to see the fruits of my labor: my class performance improved, I earned academic scholarships, and consistently made the dean’s honor roll.

The study skills that I learned have been invaluable. They continue to help me achieve academic and personal success. I believe that it is important to be honest with yourself. Never settle with just being “good enough.” No matter where you are academically, there is always room for improvement.

Ariel Morrow

Like other college students, I take my academic career seriously. Being a pre-medical student, majoring in Biology, I volunteer, shadow, belong to a pre-medical society and work two part-time jobs while maintaining a good academic standing. It is rather overwhelming, but I figured out a way to handle all those tasks and still be an A student.

I always felt that I needed more than 24 hours in a day to complete all my tasks. Indeed, many students feel that way. Luckily, after reviewing the manuscript for, Six Steps to College Success, I realized what was wrong. In the chapter on keeping focused, I learned about internal distractions. Thanks to this book I have found a way to get rid of my internal and external distractions.
Since I always have a tight schedule it is important to me that the time scheduled for studying should only be used for studying.

I am amazed that this book is literally the only book I need for a successful undergraduate career. This is an all-in-one book. It not only talks about memory, sleep, nutrition, time management, procrastination, distractions, motivation and study strategies, but also provides step-by-step guidelines and exercises along the way for you to evaluate your progress.

I like how the book distinguishes the difference between taking notes and making notes because I feel it is very important to differentiate those two steps in the learning process. Moreover, the book describes when and how to use each type of chart while making notes. I find that very helpful in organizing detailed information in the easiest way—not only to memorize but also to review and self-test before exams.

The authors also mention each strategy’s significance and effect on studying, backed up by research and the authors’ well-known books. The section on self-talk was inspiring. It helped me recognize my own self-talk and make it more productive.

As a result, I am more confident in exams and school performance in general. We all need strategies to handle tasks more efficiently and effectively. Those strategies are right here in this book.

Whether you are a high-school student or a college student, consider this all-in-one book as a guide for your academic success.

Tran Nguyen
Do you want to take charge of your own learning? Though our work has been primarily with students in STEM (science, technology, engineering, math), this book is for all students who are looking for a study system that is effective and efficient.

We originally developed these learning strategies for graduate, medical, dental, veterinary and nursing students. Those students often tell us, “I wish I’d known how to study like this when I was in college! My life would have been so much easier!”

For the last ten years we have been testing these strategies to see if they also work for college students.

They do! They are every bit as effective and efficient as they are with our graduate and health sciences students.

So, for those of you who are interested in learning how to set yourself up for success—both now and in the future—read on.

**What Makes This Book Different?**

1. Most study skills books offer general advice of the “spend more time” or “be motivated” variety. We offer a detailed, but easy to follow, system that shows you each exact step of a complete study plan. We provide exercises to get you actively involved in each step along the way.
2. Other study skills books provide little, if any, scientific background for the advice they offer. Our study system is grounded in an evidence-based approach to learning—from Ebbinghaus’s work on learning and memory in the 1880s through the most current research findings.

3. This book is based on over three decades of experience in helping students succeed academically and in their careers and lives. In addition to the research literature, our own students tell us these strategies work. We have worked directly, in groups and one-on-one, with over 3,000 students. We use insights gained from working with a wide variety of students in this book.

4. These strategies work equally well for online courses and for traditional classroom settings.

5. The new field of Educational Neuroscience draws from the disciplines of education, psychology and neuroscience. We have been drawing from these same disciplines of study for over 20 years! Much of the recent research in educational neuroscience better explains WHY the strategies we’ve been teaching are so effective.

This study system will help you retain the information presented in your classes, textbooks and labs and will teach you to:

› Reduce stress by developing a manageable schedule
› Get the most out of lectures
› Use critical thinking to organize essential information
› Create highly organized notes for easy review and self-testing
› Recall and apply information for exams and laboratory work.

As a college student, you are making a big investment of your time and money. Economists at the U.S. Department of Labor have shown that earning a college degree is an excellent invest-
ment in your future career (http://www.bls.gov/emp/ep_chart_001.htm). If you follow our study system, you will be in a much better position to profit from your educational investment.

Studying For the Long Term
What Do We Know About Learning, Retention and Long-Term Memory?
Some people mistakenly believe that new technologies and electronic devices make storing information in long-term memory obsolete. While the devices we use to access information will continue to rapidly evolve, the strategies we use to learn and remember that information will move at a slower, more human, pace. In fact, having access to so much information makes it even more important to learn how to use our brains efficiently and effectively!

In order to promote higher forms of thinking (analyzing, evaluating, creating) instead of just recalling facts, Benjamin Bloom developed a classification system of different types of mental skills. It is called “Bloom’s Taxonomy” and was updated in 2000 by Lorin Anderson, a former student of Bloom.

The strategies taught in this book (especially note-making) will help you move to the higher levels of thinking (analyzing, evaluating, creating) and help you remember information for the long term.

Figure 0.1 Bloom’s Taxonomy: Cognitive Domain

Image provided by Wikipedia @ http://en.wikipedia.org/wiki/File:BloomsCognitiveDomain.svg#file
Cramming, for example, does not put information into long-term memory. You may recall enough from your all-nighter to do okay on a test the next day, but chances are that crammed information will be forgotten soon after the test. This is not an efficient use of your time if you’re going to have to re-learn the information later. Keeping a steady study schedule, on a daily and weekly basis, allows for quick, repeated reviews, which is what puts the information in your long-term memory. This is called the “spacing effect” and is well documented in the literature. (See Pavlik & Anderson in the references at the end of the chapter.)

In your everyday life, what information do you have in your long-term memory? What numbers, routes, passwords or facts do you easily remember? If you answer, “The ones I use the most,” you are absolutely correct. Psychologists who study learning and memory have shown that going over information multiple times increases learning, memory and long-term retention.

More than a century ago, a German psychologist named Hermann Ebbinghaus described the process of forgetting. He called it the Forgetting Curve. He also showed that you can slow down the forgetting process by periodically reviewing the information.

Don’t worry about running out of long-term memory in your brain. Our brain’s storage capacity is so vast that cognitive
scientists have not been able to measure how much information the brain can hold in long-term memory! (Clark, Nguyen & Sweller, 2006).

Students often tell us that they make an interesting discovery when tracking their study time. Students who spend their study time cramming often put in more hours of study, with unsatisfactory results. Students who have a systematic approach to their studies typically find they make better grades. Who wouldn’t want to study fewer hours and get better grades?

How to Slow Down the Forgetting Process
The steps in this book show you how to slow down the process of forgetting by making it possible to periodically review and self-test on the information you want to remember. For example:

Step One: Schedule time to do the next three steps.
Step Two: Prepare for class.
Step Three: Create notes in logical patterns that are easy to review and self-test.
Step Four: Review your notes regularly between exams and self-test from your own notes or practice exams.

Step Five: Save time and remember more by learning ways to increase your concentration when studying.

Step Six: Keep calm when studying and preparing for exams by using productive self-talk and taking care of yourself physically.

The Learning Process
Learning is a process which begins with scheduling enough time for study, preparing for lecture, reading and interacting with the material by working problems or making organized notes. It then continues with reviewing and self-testing and culminates with the application of knowledge on a test. See the flowchart below.

Figure 0.3 Learning Process Flowchart

Supporting Factors:
- Time Management
- Mind Management
- Body Management
How Do These Six Steps Help You in College—and the Rest of Your Life?

The secret to success in almost anything is taking small steps that will lead you closer to your goal. We have broken each of the learning strategies into easily applied components. If a step seems too big to you, break it down further.

There is a word for what the Six Steps teach you—**Grit**. Grit is also defined as perseverance or determination.

In recent years, Angela Duckworth has done extensive research in this area. In fact, she has developed a grit survey that only takes a few minutes to complete. If you would like to take a quiz to determine your current level of grittiness, go to http://www.authentichappiness.sas.upenn.edu/Default.aspx or use the link provided at end of this chapter in the References section under Grit Survey. The good news is that grit, like other characteristics, can be improved with deliberate practice.

These steps will also help you be successful in other areas of your life. As you go through the book, look for ways to apply these strategies to the rest of your life with family, friends, athletics and work. Being prepared mentally, emotionally and physically are important in all areas of your life and this book can help you develop those habits of success.

Maintaining Motivation

Some days your college experience will be more like a marathon than a sprint, so it is important to build in small rewards for yourself along the way in order to keep up your motivation. These rewards can be as small as having a snack, a verbal pat on the back, listening to a favorite piece of music or taking a walk. An evening getaway for a movie and dinner could be a larger reward. Plan these treats ahead of time and reward yourself when you’ve accomplished what you set out to do. Enjoy the fruits of your labor!
A secret to maintaining motivation is to learn to reward the effort. Don’t wait until the end of a semester or even when an exam comes around. Reward yourself for preparing for lecture every day. Reward yourself for creating a beautiful set of study notes. Reward yourself for putting in the number of study hours you need each week.

The main thing to keep in mind about rewards is that your reward should not get you off track in your studies. Just as a dieter should not be rewarded for losing ten pounds by eating an entire carton of ice cream, neither should a student be rewarded for a good exam grade by missing the next few classes. Choose a reward that will keep you on track with your goals and that you can enjoy guilt-free!

Keep your rewards short and sweet and enjoy them frequently!

List three small activities you can use to reward your study activities this week.

<table>
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<th>Study Activity</th>
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How to Use This Book

The beginning of a course is the ideal time to start using the strategies we teach, but if the course has already begun, go ahead and start with the weekly plan below. It’s much better to get started part way through the semester than to wait until an entire term passes by. It will take you about six weeks to work through the material in this book. Since this is meant to be interactive, it will not be helpful to just read without doing the quizzes and exercises. After the exercises, you will analyze your own experience and decide which permanent changes in your study strategies will lead to the greatest success—and decide if you are willing to make those changes. The sequence of topics is carefully designed, so we don’t recommend skipping around the chapters your first time through.

Scheduling time is first, because you can’t accomplish the rest of the system unless you have scheduled enough time. Pre-reading comes second, because it is the next step in the system we recommend. You get the idea.

Week 1: Read and complete the exercises in Start Here and Step 1, Time.
Week 2: Read and complete the exercises in Step 2, Prepare for Class.
Week 3: Read and complete the exercises in Step 3, Read and Make Notes—and continue practicing time management and preparing for class. Take your time in going through this step. Note-making is crucial to this entire study system.
Week 4: Read and complete the exercises in Step 4, Review and Self-Test. This is the last component of our study system. The rest of the book consists of information on how to improve your ability to use the system.
**Week 5:** Read and complete the exercises in Step 5, Keep Focused.

**Week 6:** Self Talk is Step 6. These are methods for increasing motivation and decreasing test anxiety.

After week six, evaluate your new study system. Make adjustments if needed, reward yourself for positive changes made—and keep up the great work!

We’ve included a bonus section on how to apply *Six Steps* to preparing for classroom and standardized exams. If you are planning to pursue graduate studies, this section can help you get ready for your entrance exam.

## Current Study Strategies

Take a few minutes and briefly describe how you currently study. How do you prepare for classes and/or exams? When and where do you do it? Be as detailed as the space allows.

________________________________________________________________________

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________________________________________________________________________
After you complete this workbook we’ll ask you to return to this section so you can evaluate the changes you have made in how you approach your studies.

This study system works—if you work the system. That means completing the exercises—not just reading the book.

Summary

The steps we teach will help you learn information for the long term and will help you accomplish what you need to in an effective and efficient manner.

Until we become a paperless society we are going to assume that you will be using both paper/pen(cil) and digital devices while studying and learning material, so we will address the pros and cons of each as we continue.

We welcome you on this path of discovering the most effective and efficient strategies for learning and memory. These strategies have been used successfully by thousands of students in professional and graduate studies and we are confident that they will be useful to you as well.
References

(So You’ll Know We Didn’t Make This Stuff Up!)


Anderson, a former student of Bloom, and others, revisited the cognitive domain in the learning taxonomy and made some changes, the two most prominent ones being, 1) changing the names in the six categories from noun to verb forms, and 2) slightly rearranging them. Link to graphic: http://en.wikipedia.org/wiki/File:BloomsCognitiveDomain.svg


The guidelines in this book are based on more than 25 years of research conducted by John Sweller and his associates. Application of the cognitive load theory leads to efficient learning by minimizing or eliminating irrelevant material and emphasizing that which is relevant.


These findings suggest that the achievement of difficult goals entails not only talent but also the sustained and focused application of talent over time.


Among adults, grit was associated with educational attainment. Among adolescents, grit predicted GPA. Among cadets at the United States Military Academy, West Point, grit predicted retention. Among Scripps National Spelling Bee competitors, the survey predicted final round attained.

Ebbinghaus was one of the first scientists to study learning and forgetting. His work has withstood the test of time and is still often quoted.


The author has done field work observing and interviewing high performers and now advises clients on how to use stress to their advantage to perform at the highest level possible.


This guide is based on current cognitive psychology and instructional design theory and research. It addresses creating instructional materials, which is the same task that students must undertake when they make their own study notes.


Research in attribution theory and motivation indicates that rewarding both effort and achievement induces people to be more willing to do a task again and even take on more difficult challenges.

Grit Survey. To take the survey, registration is required, but it is free. Look under “Engagement Questionnaires.” The Grit Survey measures the character strength of perseverance. http://www.authentichappiness.sas.upenn.edu/Default.aspx


Maurer suggests the following actions to bring about change: ask small questions, think small thoughts, take small actions, bestow small rewards, identify small moments.