University of Alaska Anchorage - School of Engineering

ENGR A151 - Introduction to Engineering - Spring 2012

My Process to Become a "World-Class" Engineering Student

by

Date of submission

12/04/2012

Graduating with a Bachelor of Science degree in Civil Engineering is currently my major goal. I chose the field of Engineering because I would like to use knowledge of the natural world around me to help people and help the world advance. I have enough confidence in myself to know that this is something I can achieve if I just set my mind to it and take in all the knowledge around me that I can. As of now, the only thing that is keeping me from obtaining that goal is that there are decisions I need to make, goals that need to be set, and attitudes and behaviors that need to be developed. In the following sections I will outline those goals, steps, attitudes, and behaviors that need to be established so that I may become a "world-class" engineering student.

Why Do I Want to Be an Engineer?

Up until about a couple months ago I completely felt like I was starting off in the wrong field of study. The only reason I signed up for engineering classes was because I had been told time and time again that I would be an incredible engineer. After reaching college math in high school and getting amazing scores, I had both parents and teachers encouraging me to go into the field of engineering. They told me it was a great field to go into because of the many opportunities available (especially for women) and the guarantee of financial security. I must admit that these were convincing arguments, but I still wasn't sure whether it was the career that best defined "me". After reading about the field of engineering and the diversity in which the field can be applied, I discovered I was in the right place and engineering was the career for me. Maybe my parents and teachers knew me better than I thought.

One of the first things about engineering that caught my attention and led me to realize that it was the career for me was the fact that in getting a Bachelor of Science degree in engineering, absolutely no doors are closed from there on out and I have the ability to become whatever I want. This is one of the things that scared me most in choosing a career, the fact that in choosing one path, all other paths were closed. But going into engineering, I don't have to know just yet exactly who I want to be or exactly what I want to accomplish, all I have to do is get a general idea of the path I want to take and from there on just learn as much as I can. In my opinion, one of the biggest benefits in engineering is the freedom and diversity offered in this career.

The second thing that really caught my attention about engineering is that it requires an analytical and logical mind that still has the capacity for creative thinking. This describes my brain

perfectly as I have always been a very analytical and logical thinker with a passion for creativity. I have always loved the type of problem solving where you look at a problem from many different viewpoints and then throw around very out-of-the-box solutions. I've been told that I have a very abstract mind and interesting way of looking at things, so I feel that I could offer a beneficial viewpoint to many engineering problems that face the world today. I feel very happy to have discovered the field of engineering because not many careers require you to access both the left and right side of the brain as deeply as engineering. I am a person that is highly active in both the left and right side of the brain; I have the mental ability to follow mathematical, logical concepts yet at the same time my mind is constantly wandering to all the possibilities of the world. Engineering is a career where I can utilize my brain entirely, without neglecting one side of my brain. I think that an even balance of left and right brain is absolutely necessary in Engineering because without knowledge, many things could not be developed, and without creativity, many things could not be imagined. This understanding of Engineering helped me realize that it is one of the only careers where I will be able to use my brain to its full potential.

Another thing that struck me about engineering is the possibility of what I could accomplish. I have always been the kind of person who is very aware of the world and cares about the issues that society faces. I dream of taking all the knowledge that I gain throughout my life and using it to help others. I want to change the lives of others in a positive way so that they have the ability to live a satisfying, happy lifestyle. My interest specifically lies in helping the underdeveloped, struggling communities that need outside knowledge the most. I would really enjoy traveling to other countries and initiating projects to improve poor conditions and struggling lifestyles of people in these underdeveloped communities. Not only would I want to help these communities but would also want to learn about the culture that makes up their everyday lives and what insights they have to offer. Ultimately I want to use my logical understanding of the world to make connections with the world. I want to travel, help people, learn new things, and ultimately expand my horizons. I feel engineering could offer all of these opportunities.

Lastly, but not most importantly, I would like to become an engineer for one of the most typical reasons, financial security. I feel that financial security is very important to me, as it will help me lead a healthy, unburdened lifestyle where I will be able to provide for a family in the long run. Further than that I will be able to offer my family opportunities that people in poverty or lower

income jobs could not offer. In general I feel that engineering is a career that opens all the possibilities of the world. I know that the road ahead will be a difficult one, but it is something that anyone can accomplish if they really put their mind to it. Now that I have my mind set to it, I know that I am ready to embark upon my path to become an engineer.

My Learning Style

Before I can make my way to becoming a "world-class" engineering student I need to know my preferred style of learning so that I can understand how I learn new knowledge most effectively. In order to figure out my learning style, I took the Index Learning Styles Questionnaire. According to this questionnaire, my style of learning is:

- Sensing vs. Intuitive
- Visual vs. Verbal
- Reflective vs. Active
- Sequential vs. Global

I completely agree that I am both very reflective and sequential in my learning methods, as I like to think through things on my own and in a very logical order. But the type of information I prefer and the sensory channel through which I perceive information most effectively definitely came as somewhat of a surprise to me. I thought that I would prefer intuitive information rather than sensing information and more verbal styles of learning rather than visual styles of learning.

As for my preferred sensory channel it is not completely off, it is just in the middle of verbal and visual learning styles leaning towards the visual learning style. Perhaps I see more importance in words but get more knowledge out of images than I give them credit for. I definitely am a very visual person, but I feel that words give more insight than visuals. Maybe the pairing of both words and visuals is the most effective way for me to perceive information. I feel that this is a good thing because both facts and visuals are what most teachers tend to incorporate in their teaching.

As for the type of information I prefer, I was very surprised to see the results on the opposite side of the spectrum from intuitive information. I've always seen myself as a very intuitive thinker, but maybe that's just my way of thinking, not the way I like to learn. Maybe I like to learn things in a methodical manner but later think about them intuitively. Either way, maybe it is a good thing that I see myself as an intuitive learner even though I may not be one now, because that means it

will make it easier for me to grow from a sensual learner into an intuitive learner making me a better fit for the field of engineering.

The main thing I would like to change about my learning habits is the way I learn information. I usually just learn facts and don't apply them intuitively to the world. I am very good at memorizing facts and passing tests, but I need to take my education beyond that. I need to take the facts I learn from classes and apply them to the real world because eventually, once I'm an engineer, that is what I will be doing and I need to practice that skill now.

Making the Change from High School to College

At the start of my journey of becoming a "world-class" engineering student, I am introduced to a completely new environment. High school and college are very different and so I must understand the differences as well as what behaviors and habits must be changed. Outlined below are the differences I noticed between high school and college and the changes that need to be made so that I can become a fully adapted college student.

The first difference I noticed in the teaching/learning process of college and high school is the type of information that is taught and how that information must be processed. In high school, what is mainly required of students is memorization of facts for a topic. In college the topics discussed are much more in depth and focus more on concepts and how you can apply the concepts to the given field or the world. I feel that a good way to adjust to this is by viewing everything being learned from a larger perspective and by finding connections between multiple courses so you can see how everything relates in the grand scheme of things. I feel that this would help take what is learned in class from simple facts to concepts that can actually be applied to other classes or the world itself.

One of the main reasons why college is so much harder than high school is because in high school, topics are covered over and over in class. In college information is usually not repeated so it is expected that the students go over the information themselves. I feel that the best way to adjust to this is by scheduling "reiteration study sessions" where the material from each class is gone over. This would be like having more time in class to go over information, like in high school where the information is reiterated over and over again, but the only difference is that it is the responsibility of the student to find time to do this.

Another big difference I noticed in college is that so much more time is spent outside of class doing work than in class. That means that it is the responsibility of the student to make time to do this work. I actually think spending less time in class and more time outside doing work is better because it gives the student the opportunity to go on their own time frame as well as use only the time that is needed. In high school a lot of time for students is wasted because they finish what they needed to do but are still required to stay in the classroom. The restrictive nature of high school also puts constraints on the freedom of the students, as they are expected to attend class every weekday, whereas in college the classes are short and vary to fit the students scheduling needs. So finding time outside of class to do work was very easy for me to adjust to, as it is a much more practical method for schooling.

I have found that being in college there are many more opportunities to go out and seek help than in high school. In high school the only real resources available are teachers, who are usually busy, and other students in class, who usually need help as well. In college there are many centers filled with volunteers just waiting to give out their knowledge and the teachers are just as willing to offer help. I feel like these are very valuable resources that everyone should take advantage of and incorporate into their studying habits. Although, this is something I will have to adjust to, as I am not used to having many places to go to seek help. In order to adjust to this I must get in the habit of using these resources if I ever need help rather than just trying to go at it alone.

The last thing I noticed about college is that there are many more opportunities to meet people in your field of interest than in high school. In high school everyone is just bunched together by location, but in college people come from all over the place to study in their field of interest. This allows you to meet people in your field of interest, which you can interact with and seek help from. Usually it is a little difficult for me to meet new people, but in college it is easier since I am around people with similar interests. I would like to adjust to this aspect of college by meeting many new people in my field and interacting with them outside of class.

The two major mistakes that I know I make as a college student are,

      1.) I spend little time on campus, and

      2.) I study alone.

These are bad habits that I definitely need to change.

The first problem I have, that I spend little time on campus, is largely due to being used to the high school environment. In high school, once school was over the teachers wanted you out of class and the security guards wanted you to go home. So I was used to going to my classes and then leaving immediately after my classes without spending any time in school to meet with teachers or other students. I can start adjusting to this by first taking the gaps I have between classes to stay on campus and study rather than going out for lunch or going home. Staying on campus at these times would be an efficient use of time, as well as gas. Another way I could change this is by making the campus my study environment and recreational environment. This could help me use my time more efficiently and possibly give me more free time to do fun things or get the relaxation needed to focus on my studies. I also feel that spending more time on campus would help me get work done more effectively as it will keep me from the distractions I would have at home, and then allow me to give in to those distractions once I get home.

Another mistake I make as a college student is that I usually study alone. The reason why I usually work alone is because I feel like I get more work done when I don't have distractions from the outside world. I also feel like anything I'm learning, if I try hard enough, I can figure out myself. But maybe it is best that I look to others for help, because in the end what others can teach me are not only the things I don't understand in class, but also things about life in general. In order to change this habit of studying alone I would like to meet more people in my field of interest that would like to study in groups and schedule study sessions where we can all work together. I feel that it would be very helpful to be studying with people in the same field of interest as we can share not only knowledge on topics in class but viewpoints on the field that would give me a better insight into my own career path.

Solving these two problems go hand-in-hand; spending more time on campus will allow me to meet new people in my field of interest that I can create study groups with, and in creating these study groups I will have a reason to spend more time on campus. So solving one problem will also help solve the other, and help me to become a better college student.

Priority Management

Being an engineering student one of the most important traits to have is an ability to prioritize. This means choosing to do things that are more important over things that are fun

sometimes. People who prioritize generally are able to complete tasks in a less urgent manner and usually perform better. The best way to prioritize is to organize any tasks or activities into a matrix with four quadrants. The first quadrant is for tasks that are urgent and important, the second quadrant is for tasks that are not urgent but important, the third quadrant is for tasks that are urgent but not important, and the fourth quadrant is for tasks that are not urgent and not important. Here is an example of a priority matrix that I made this past semester:

I Urgent and Important	II Not Urgent, Important
-Choose a major -Set-up a "Road Map" -Write an outline for my project -Change bad attitudes or behaviors -Study for midterms -Start studying with my peers	-Assignment #6 -Write paper -Study material learned in lectures today -Play guitar -Dance
III Urgent, Not Important	IV Not Urgent, Not Important
-Answering a phone call -Friends coming over -Checking a notification on Facebook -Favorite show on T.V.	-Watching T.V. -Pointlessly searching the internet -Facebook -Napping

[1]

From making this matrix I learned that my items are not organized how they should be. There are more items in the urgent and important quadrant than in the not urgent, important quadrant, which is where they should be. My matrix is not that terrible as I am not a big fan of procrastination so assignments are usually checked off my list of things to do quickly. The things that I usually put off until the last minute are things such as long-term goals. It is easy for me to knock out weekly assignments because I can get them done in one sitting and that is how I work best. But when it comes to studying for tests or working on long-term goals, it requires time dedicated over an extended period and I am not good at spreading things out like that.

This is the reason why all the things in the first quadrant that are urgent and important are things like determining my major, setting up a "Road Map", getting started on a semester long project, changing attitudes and behaviors, and studying for tests. These things all require work over an extended period of time. Making this priority matrix made me realize that I have a harder time working on long-term assignments than short-term assignments, something that I did not think about before.

I should try to change this problem by dedicating time each week to long-term assignments and goals. This time does not have to be very long, as I only need to be taking baby steps in my long-term assignments and goals. For example, I could start by taking some time this week to write down my goals as an engineer and possibly choose a specific field of engineering. If I achieve that, then I could also create a "Road Map" which should not be very difficult to do once I choose a major. Taking this baby step in choosing my career will make it so that in the future choosing the correct classes or internships to become a part of will not be in the urgent and important quadrant. If I make clear my goals now then choosing those things mentioned above would suddenly fall under the not urgent but important quadrant, as I will have a clear idea of what I want and therefore can make decisions in a calmer mindset.

I also need to start working on my attitudes and behaviors that need to be changed as well as start studying with my peers. If I don't start working on these things now, then when I enter the engineering work force those attitudes and behaviors necessary for the field and the ability to work with peers will suddenly become urgent and important skills for me to develop. I don't want to be in a position where I have to play catch-up in my personal behaviors and attitudes because that could seriously get me behind in the working world and cause me to lose many opportunities as an engineer. It is best to begin working on these skills right now, so that when I come out into the real world I am not just a student with knowledge of engineering, but already a practicing engineer with the knowledge AND skills necessary to become a great engineer.

Choosing Productive Actions

One of the most important steps for becoming a "world-class" engineering student is choosing productive actions. Choosing productive actions starts with turning our thoughts from negative ones to positive ones. In the following paragraphs I will discuss the negative thoughts that prevent us from choosing productive actions and how to change those negative thoughts to positive ones so that we may choose productive actions.

The first and most common thing that stops us from choosing productive actions is that most of the non-productive actions we do usually satisfy some need. In order to change these non-productive actions into productive actions, the non-productive actions that satisfy some need must either be replaced with productive actions that satisfy the same need or time must be scheduled

accordingly so that the non-productive actions do not interfere with productive actions. A good example of this change from non-productive actions to productive actions would be with the need to hang out with friends. The time used to hang out with friends could either be scheduled in a way that didn't interfere with school, or homework and studying could be done with friends, which in many cases is a much better learning environment. As we can see here, the need is still satisfied but the actions are productive and only bring the student closer to his or her goals, rather than taking the student further from those goals.

Another barrier that must be overcome is that productive actions are thought to be difficult and un-enjoyable in general, so instead of choosing tasks that are unpleasant we choose to do things that are pleasant, which are usually non-productive actions. The best way to overcome this barrier is by making the task less daunting in our mind. If we change the way we think about the task from a negative thought to a positive thought then it would make the task seem less unpleasant. A good strategy for doing this is to look at the big picture rather than the individual assignment. For example, rather than thinking "I am not looking forward to doing my Calculus homework", think instead "I am excited about getting my Bachelor of Science degree in engineering". If we look at things this way then we find a purpose in the small and unpleasant tasks we must complete in order to achieve our long-term goals. Another good strategy for completing tasks that may be unpleasant is to tell yourself that you will work on the task for five minutes, if after five minutes you can continue without frustration then keep working until the assignment is either finished or help is needed. If after five minutes you can't get anywhere, go seek out help. Working with others is usually a lot easier, and a lot more fun than working alone anyways.

Another barrier that I would like to discuss is that a lot of people are afraid of failing if they do attempt productive actions. The only advice I have for people who feel this way is that sometimes grades don't always reflect ability, so even if a discouraging score is received, keep going and keep trying. The only way to ever really fail at something is to not even try at all. Not trying because of a fear of failure almost guarantees failure, so if failure is a huge fear then at least give difficult tasks a shot and eventually the effort put in will show. Just remember the motto of the Minority Engineering Program of California State University, Northridge, "No deposit, no return". [1] If we remember this, we see that just trying, or in this case depositing, gives us at least a small chance at having some return, rather than no chance of having any return at all.

Another barrier to choosing productive actions is a preference to place the blame for failures on other people or external factors rather than taking responsibility for failures. The best way to fix this is by first taking in the easier realization that successes are a result of one's own individual effort. Once a person can take responsibility for successes they can also begin to take responsibility for failures. If responsibility is taken for both successes and failures we learn that we can change our results or outcomes as well as bask in our successes. This gives a sense of control, which in turn leads to an increased self-esteem. Self-esteem and a sense of control over one's life are both traits that can lead to great academic success.

Other barriers from productive actions that I feel must be overcome are disorders such as anxiety disorders, ADHD or ADD, and depression. Many teens and college students suffer from these disorders in today's population. We must learn how to treat these disorders accordingly so that we can be mentally stable enough to be able to do productive tasks. If a person is not mentally stable, it is sometimes very difficult to do even simple tasks, so it is very important that these things be taken care of before they have a major negative impact on academic success. Medication and therapy is offered for many disorders nowadays and I feel that these treatments should be used in order to promote the highest amount of success possible.

If all of these barriers from positive actions can be overcome, then I can move closer to the achievement of my goals. Whenever I find myself dreading something I should be doing, all I need to do is change my mind set as mentioned above. These strategies will allow me to easily turn all non-productive actions into productive actions, and in the long run bring my goals closer.

Managing Stress

In becoming a "world-class" engineer it is not only important to be a good student, but to be a healthy student, both physically and mentally, and as the field of engineering is quite taxing, stress is common. In order to figure out my personal level   of stress I took the "How do you respond to stress" test and discovered that there are many regions in which I am affected by stress. I am affected by stress physically, mentally, emotionally, and socially. Physically, stress affects me with headaches, fatigue, insomnia, colds and a pounding heart. Mentally, stress affects me by giving me a negative attitude and an increased sense of boredom. Emotionally I am affected by stress with anxiety, irritability, depression, and worrying. Socially, stress causes me to feel isolated

and lonely. In the paragraphs that follow I will describe how I can cope with these reactions to stress.

I can cope with the physical stress-related problems, such as headaches, fatigue, insomnia, colds, and a pounding heart, by taking care of my general health. A healthy diet and frequent aerobic exercise would decrease the severity of headaches, the constant feeling of fatigue, insomnia, and frequent colds. A healthy diet and frequent aerobic exercise also takes part in reducing stress itself. Other things that should be avoided in order to reduce the physical impacts of stress are caffeine, drugs, alcohol, sleep deprivation, and any dangerous or bad situations.

A step that can be taken to reduce the mental affects of stress, such as a negative attitude and increased feelings of boredom, is to engage in enriching, fun activities on a regular basis. Although my schedule is very busy, I know that there is always a little bit of time left over for fun. If there isn't any time for fun, then I know I need to rethink the way I am living my life. Fun and engaging activities would help to give me a more optimistic outlook, and also decrease my feelings of boredom.

Emotionally, the affects of stress, such as anxiety, irritability, depression, and worrying, can be coped with through the help of friends and family, as well as professionals if necessary. Sometimes I crack from stress because my emotional needs are not being met. When this happens I find it is best to go to those that I am closest to and just talk things out. Letting emotions and feelings out to another human being who cares can do wonders for emotional health.

Lastly, interaction with other people is really the only way to cope with the effects of stress on social life, such as feelings of loneliness and isolation. Meeting new people and making new friends might cause more stress at first, but in the long run it gives a wider range of people to depend on when stress becomes overwhelming. Like the Beatles song goes, "I get by with a little help from my friends", friends are there when help is needed. They can also help to reduce the feelings of stress in the long-term by creating a relaxing, friendly environment that is usually quite enjoyable.

All in all, every aspect affected by stress can be coped with through a general healthy lifestyle, engaging in fun activities, keeping healthy personal relationships, and getting professional help if it is needed. If I make these stress preventers a regular part of my lifestyle then I can continue to grow into a "world-class" engineering student.

Summary

In this class I learned many methods for becoming a "world-class" engineering student. I then implemented these methods in my life so that I could work my way towards becoming the best student I can be.

First, I evaluated why I would like to become an engineer in the first place. I feel that this step was very helpful as it reminded me of my desired end result, which gave me the motivation necessary to complete tasks that might seem unpleasant but that are working towards my desired end goal.

Second, I figured out what my learning style is and how I learn best. Knowing this is very important as it allows me to supplement how my teachers teach with how I learn best. Learning material through my style of learning will help me to retain information in the most effective way possible.

Next, I discovered all the changes that needed to be made going from high school to college. Before beginning this project I didn't even think about how much I would need to change my habits just switching between two different types of schooling. But after analyzing all the differences between high school and college I discovered all the habits and behaviors that needed to be changed.

Next, I organized my priorities so that I can complete my degree in the most efficient way possible. By organizing my life into necessary tasks and unnecessary tasks I could prioritize and complete only tasks that help me move forward. This step also goes along with choosing productive actions. In my pursuit of becoming an engineer, I decided that I should only be choosing productive actions if I want to achieve this goal. Along with choosing productive actions, I must also make an attempt to choose positive thoughts and feelings whenever possible.

Finally, I worked on the area that needs the most improvement for me, managing stress. I began to realize that if I want to become an engineer I need to learn how to manage my stress so that I can be mentally stable enough to choose productive actions that will lead me towards my goal of becoming not just a "world-class" engineering student, but, even further, a "world-class" engineer.

Appendix

My Road Map to getting my Bachelor of Science degree in Civil Engineering

Year	2012, Fall	Credits	Year	2013, Spring	Credits
ENGR A151		1	MATH A202		4
ENGR A161		3	PHYS A211 + L		4
CPLX A200		3	CE A152		1
HNRS A292		3	FREN A202		4
ENGL 212		3	DNCE A490		3
DNCE A321		2			
MUS A164		1			
Total Credits		16	Total Credits		16

Year	2013, Fall	Credits	Year	2014, Spring	Credits
CHEM A105 + L		4	CHEM A106 + L		4
MATH A302		4	ES A209		3
PHYS A212 + L		4	GEO A155		3
HNRS		3	HNRS		3
			DNCE		2
Total Credits		15	Total Credits		16

Year	2014, Fall	Credits	Year	2015, Spring	Credits
Basic Science		3	CE A441		3
ES A302		3	ESM A450		3
ES A210		3	ES A331		3
CE A334 + L		3	HNRS		3
HNRS		3	FA		3
Total Credits		15	Total Credits		15

Year	2016, Fall	Credits	Year	2017, Spring	Credits
Technical Elective		3	Technical Elective		3
CE A442		3	CE A403		3
CE A437		1	CE A438		3
FREN		4	FREN		4
HNRS		3	DNCE		2
DNCE		2			
Total Credits		16	Total Credits		15

References

[1] Landis, Raymond B., "Studying Engineering: A Road Map to a Rewarding Career", 3rd Edition, Discovery Press, Los Angeles, California, 2007