

University of Alaska Anchorage - School of Engineering

ENGR A151 - Introduction to Engineering - Fall 2012

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

by

Date of submission

12/4/2012

Introduction

This report is an examination of my goals as an engineering student and the methods by which I plan to achieve them. The primary purpose of my writing this report is introspection; through the readings and lectures provided to me by my school in the past semester, I have learned a great deal about how to improve my chances of success in achieving my goals, and much of that process amounts recording your thoughts and organizing them in a verbal or visual format. In this report I hope to document my understanding of myself, my motivations, and my abilities and structure them in such a way that they will be accessible for the extent of my education and my career.

My Current and Future Goals in Engineering

At this point in my life, the goal upon which I place the most value is graduating with my Bachelors of Science in Mechanical Engineering as a world class engineering student. In my opinion, the achievement of this goal is vital to my future success in terms of both happiness and financial security. To this end, I am currently devoting all of my energy and nearly every other aspect of my life is constructed around the necessary tenets my academic success. In the course of my graduating with a BSME, I aspire to maintaining a GPA that is at least above 3.0, but ideally I would achieve higher than that.

Over the course of my taking Engineering A151 I have been exposed to new ideas, some of which have changed my perspective on engineering as a career greatly. Because of these changes which I noticed taking place within myself, I have begun to include in my list of goals aspirations which reach into the political realm of the professional world. For example, the recent lecture during which my class heard presentations from the various student engineering organizations has caused me to rethink my behavior in this program as of this semester, and I have decided that it is very important that I join as many student organizations as possible. I have realized that no amount of effort can gain me success in a professional field if no one knows I am applying it, and consequently I am devoted to joining groups such as ASME and Baja SAE, both of which have a strong presence at UAA and strike me as very interesting.

In fact, the substance of engineering itself is very close to my personal ideals. A career in engineering is something I have aspired to for nearly as long as I can remember knowing what it was. When I was younger the allure of the engineering profession was provided mostly by the opportunities for creativity and innovation that it offers, but as I've grown older I've also found myself drawn to the stability of the global market for engineers and the wide variety of applications for a person trained in the art of engineering.

Engineering would be, from my perspective, the most fulfilling career option for me as an individual. I have always been very interested in the applications of math and science, and consider myself to be a creative person who would benefit from having an outlet for my drive to innovate. In my view, the logical approach proffered by the engineering mindset is optimal for solving nearly any problem from those involving research and technology to personal problems one encounters in his professional and social life. I believe the process of determining methodically the most efficient means of accomplishing a goal to be a healthy approach to both life and innovation; being provided a degree that opens the door to a prosperous and stable career is only one of the benefits offered by completing an engineering curriculum. Learning the skills to properly allocate resources such as energy, money, and time can serve a person in both professional and private environments. I believe a career that challenges an individual to balance economy and function in concrete applications of mathematics and science would be valuable to me in terms of its intellectual allure as well as through its impact when integrated into one's identity; I believe that the stresses placed upon an individual by the task of engineering to be of the variety that I am most suited for, and I believe the work done by an engineer to be the most appropriate for me due to my interest in the subject matter behind the profession and my desire to put my problem solving abilities to good use.

My "Roadmap" to Success

I have, to the end of reaching this point successfully, compiled a "roadmap" that will hopefully guide me through the four or five years of my degree without incident. The following roadmap includes all the classes I will need to take over the course of the next few years and has served to aid me through its detailed nature.

Year	2012, Fall	Credits	Year	2013, Spring	Credits
	ENGR A151	1		CHEM 105/L	4
	SPAN A201	3		ENGR 161	3
	COMM A111	3		MATH 200	4
	MATH A108	4		PHYS 130	3
	ENGL A212	3		ENGR 105 A, B, C	3
	Total Credits	14		Total Credits	17

Year	2013, Fall	Credits	Year	2014, Spring	Credits
	CHEM 106/L	4		ME 280	3
	PHYS 211/L	4		ES 302	3
	MATH 201	4		MATH 202	4
	SPAN 302			ES 209	3
	Total Credits	16		Total Credits	13

Year	2014, Fall	Credits	Year	2015, Spring	Credits
	MATH 302	3		ES 331	3

ES 210	3	ADVANCED MATH ELECTIVE	3
ES 346	3	ES 341/L	4
PHYS 212/L	4	GER	3
GER 3			
Total Credits	13	Total Credits	13

Year	2015, Fall	Credits	Year	2016, Spring	Credits
	ES 309	3		ME 403	3
				ME 306	3
				ME 308	3
				ME 313	3
				ME 334/L	4
	Total Credits	3		Total Credits	18

The fall semester of 2015 will be a problem that I hope to solve by taking summer classes at some point. I will have to speak with my academic advisor about the possibility of this being a problem, as ES 309 is offered only in the fall, and I would like to take as many classes as possible concurrently.

Year	2016, Fall	Credits	Year	2017, Spring	Credits
	ADVANCED ENGR ELECTIVE	3		ME 438	3

ME 441/L	4	ESM 450	3
ME 414/L	4	ADVANCED ENGR ELECTIVE	3
ADVANCED ENGR ELECTIVE	3	ADVANCED ENGR ELECTIVE	3
GER	3	GER	3
Total Credits	17	Total Credits	15

The major I want to pursue is ME. I have decided to follow through with my plan to join student organizations next semester so that I can start networking with professionals during the summer of 2013. I hope to find an internship sometime during my sophomore year. I have discovered a potential hole in my schedule which will be a problem in 2015. I am meeting with my academic advisor frequently, so hopefully I will be able to discuss contingencies with her such as shifting certain classes that can be taken concurrently to other semester or enrolling for a summer session.

The fact that I have committed myself to the accomplishment of my goal of graduating with a BSME ensures the necessity of a solid plan that will bring me closer to that goal. In realizing this, I have composed a list of the aspects of my personality I must understand in order to do so. In no specific order, I must:

- Understand the way I learn most effectively
- Understand my motives for pursuing a career in engineering
- Understand my barriers to success

My Learning Style

The first step I took in the process of completing this “to-do-list” was to analyze the way I learn in order to gain a better understanding of the most effective ways to teach myself. This part of the process I found to be very cathartic and beneficial to me. My learning style has always

tended to be more abstract than concrete, and for that reason I identify with my categorization as a reflective learner. I am much more likely to process information separately from how I utilize it and I have always needed to grow comfortable with a new idea before I could efficiently put it to use. In other words, I must fully understand an idea and be comfortable with it in full in order to put it to use, or in a classroom setting, demonstrate my mastery of it on a test. I have always known myself to be more of an intuitive type than a sensor; this is reflected in what I believe to be a somewhat related test: the Myers-Briggs Type Indicator, by which I am categorized as INTP, the “N” representing intuition, which I highly favor according to this test. My approach to learning mirrors this result in many ways. I have always learned best by absorbing as much information as possible, and then waiting for the pieces to assemble themselves in my head rather than forcing an understanding. I believe that in some ways this has served me well in my studies of the physical sciences such as physics in its own right.

I believe that my memory is mostly visual, but that my understanding and processing of information is mostly verbal, if this is at all possible. But regardless of the format in which information is presented to me, organization is the single most important factor in my memorization of any material; in some cases a well-designed graphic will have a much greater impact on me than a 30 minute lecture and vice-versa. As for the way my brain catalogues information for the first time, my learning style is undoubtedly global. I have in many cases struggled with new ideas in math because I tend towards not understanding something when it is not presented as a part of a whole, or as a larger concept that fits around something I already understand. In many ways this is a weakness in that I have to reorient my mind in order to retain new information, but I believe it helps me by keeping my perspective fresh. As a result of observing these traits in myself, I plan to increase the amount of reading I do and increase the amount of thinking I do about the subjects I am studying, as I believe that my learning style is suited for intuiting ideas from large amounts of information.

My Motives for Studying Engineering

My first step in the process of understanding my motives was to make a list of the benefits of a career in engineering as I perceive them. The list I created was as follows:

1. The ability to use math and science to think creatively.
2. Having a high paying job
3. Having a stable job
4. Being valued by society
5. Working with intelligent, like-minded people
6. Being able to work in almost any industry
7. Having the ability to work in the public or private sector
8. Having the option to work in academia or industry
9. Learning how to approach problems in the most efficient way possible
10. Having a diverse education with multiple applications

As of creating this list, I realized that the most important aspect of a career in engineering for me specifically involved the ability to think creatively and indulge in highly methodical and inventive thought, but this part of my motivation was followed closely by the desire for a high paying professional job with a near guarantee of gainful employment due to the historically high demand for it in the job market. It is also my belief that belonging to a career that is continuously challenging and interesting would work as a form of mental hygiene in that it demands that a professional maintain his mental sharpness and clarity of mind. The degree of responsibility and the pressure to be efficient placed on an engineer are the ideal conditions for maintaining one's mental integrity in that, unlike other professions in business, education, etc., the stresses faced by an engineer are mostly under his control or the control of others on his team. For example, in a career in education, a teacher's success is often tied to the performance of the children he teaches; each child having his own will and tendency to oppose the authority of the teacher. In business administration, a professional's success is dependent upon the market's readiness to buy the product or service offered by his company. But for an engineer, the most pressing concern is in submitting work that is up to the specifications provided by his contractors if by nothing other than trial and error.

I believe a career that challenges an individual to balance economy and function in concrete applications of mathematics and science would be valuable to me in terms of its

intellectual allure as well as through its impact when integrated into one's identity; I believe that the stresses placed upon an individual by the task of engineering to be of the variety that I am most suited for, and I believe the work done by an engineer to be the most appropriate for me due to my interest in the subject matter behind the profession and my desire to put my problem solving abilities to good use.

If there was anything that spurred me to seriously consider engineering as a career option in high school, it was in learning about how stable and high paying a career in engineering can be. In fact, I was interested to learn that the median annual wage for an engineer in 2010 was \$83,340 per year, and the median annual wage for mechanical engineer in 2010 was \$78,160 [2]. Though the financial lifestyle afforded by a career in engineering is not my primary motivation for pursuing a degree in this discipline, I will admit that the prospect of earning such a healthy annual wage is very attractive to me. Engineering is also less competitive in some respects than other disciplines when the graduation rate of students in engineering programs is compared to the industrial applications of their degrees [1].

I like the idea of developing a successful career and putting all of my energy into something that serves humanity in the direct way that engineering does. For this reason I am also drawn to engineering; I find the versatility of the profession very interesting. There are engineers in charge of maintaining technical systems at all levels: research, development, design, maintenance and inspection are all areas in which an engineer may apply his skills. My personal experience in talking with engineers who have been in the industry for many years has lead me to believe that one can find an application for his engineering degree in nearly any niche of industry supervising some technical process or laying out plans for a physical or conceptual system.

I find engineering to be, for many reasons, a very attractive career path to follow. Engineering would provide me with an outlet for my desire to make the world more efficient and to direct my efforts into something valuable to humanity. I can contribute meaningfully to society while being compensated generously and fulfilling my need for stability and security in my financial life. Of all the career paths I have considered, engineering offers the most with

respect to my sense of duty to the society I live in, and my desire for success in both my professional and personal lives.

My Barriers to Success

The final step in my process of understanding myself in an effort to ensure my success was to try to notice the barriers that could hold me back from success. The group discussion in which I participated on 10/6/2012 addressed the effects of barriers preventing success and strategies for overcoming these barriers, and I found that as a group we were able to very efficiently deconstruct each of the barriers presented to us and also offer for each a viable solution that can be easily implemented.

The first barrier we discussed as a group was the tendency of an individual to blame others rather than accept responsibility for his failures. I am of the opinion that a person's need to absolve himself of blame is typically rooted in a lack of self-esteem, the effects of which will generally expand into other facets of his identity, and commonly into areas where it can be more easily addressed with positive reinforcement rather than treated as a bad habit or psychological malady. We discussed as a group the fact that usually a person who is unable to accept responsibility for his failures is unable to do so because of his feelings of apathy and the paranoid fear that he has no control over his life or his environment. The solution I offered for this problem is simple and positive and I believe it has helped me in my academic career: personally accept credit for your success and provided you value objectivity in your self-image, you will be forced to hold yourself to the same standard when assessing your shortcomings. In essence, if you are able to admit that you are responsible for the good things in your life, then by the same logical process you will be bound to accept responsibility for the bad things that are within your control.

The second barrier we discussed as a group was of one's current behaviors and routine satisfying an unnecessary habit or desire. Our group addressed this from the perspective of a person who derives joy from an unnecessary or harmful habit and we tried to accommodate varying levels of compulsivity with regard to nonproductive urges. We decided that the best

way to approach reducing the frequency of the behavior and hopefully tapering it down to a more acceptable level was to replace the negative activity as often as possible with one that was less harmful or even beneficial. For example, a common barrier for those who quit smoking is that their smoking habit allows them an excuse for a short break out doors and perhaps a walk to clear their mind. While it may seem obvious, one can still take periodic breaks throughout the day without smoking, and reward himself with a few moments of rest rather than a cigarette. This is an example of replacing a bad habit with one that would ideally improve health when implemented.

The third barrier we discussed was being afraid to study for fear that you might fail. I believe that the fear of exerting effort in the face of possible failure is a symptom of poor perspective and possibly a signal of deep feelings of inferiority. Our response to this barrier was to recommend a change of perspective by changing the way you compare yourself to others. Everyone develops intellectually at a different rate, and everyone struggles with something. The most important thing to remember is that while you will never be the best at everything, it is untrue that you can't have some level of success in ever endeavor that you undertake. All that is necessary is to tailor your expectations to reasonable levels; do not strive for perfection in everything, but instead try to accomplish goals along the path to perfection.

The fourth barrier we addressed as a group was the difficulty in doing things you don't enjoy. Our response to this is something of a staple for self-help gurus: start to do whatever it is you don't enjoy, and allow yourself the option of quitting after five minutes. More often than not, you will not want to quit after five minutes as you have already gained momentum. This is sort of a compromise with your subconscious in that you know you won't really quit, but you are not obligating any more than five minutes of your time.

If I had to identify a fifth barrier to my success that I have experienced personally, it would be the fear of embarrassing myself or looking stupid. For example, in the past I would be unwilling to take risks with presentations I needed to do in front of people and I was often afraid of being the center of attention, but I have found this to be an aspect of my character that can be easily changed by observing myself while in the company of others. I have found

over the course of my social life that I judge myself much more harshly than I ever judge anyone else and the realization of this has been extremely freeing. If I depersonalize myself just slightly and try to imagine my actions through the eyes of an impartial observer, it becomes clear that society grants much more leeway to an individual than he does to himself.

I have also identified several of my own weakness that relate to willpower but are caused by a variety of factors. For example, I have been somewhat neglectful of note taking, especially in this class. I have already begun to remedy this though by forcing myself to summarize what I've read instead of rushing through a chapter and writing down short phrases as I process ideas. The latter method would, in my experience help me to understand things as I was reading, but failed to help me when I was reviewing the material for a test. Another weakness of mine is managing my time, with which I have always struggled. I have already begun to implement a schedule, which allows me to feel confident in my understanding of course material by laying out a step by step guide to reaching the point of mastery. I use my smartphone to schedule studying sessions and to organize study group meetings. This has proven very useful in furthering my success as a student, and I have benefited from the bonus of not having to carry a notebook around with me, as my phone has all of my information, and I'm used to carrying that with me.

Also important in understanding the barriers that held me back from success was recognizing the differences between the high school style learning I have been familiar with and the university level learning that I am just becoming acquainted with. One of the most visible and understandable differences between university and high school level studying is in the difficulty of the subject matter. Even in my first few weeks of undergraduate courses, I have noticed that the demands on me as a student are higher and the amount of time I am required to devote to my studies to increase drastically. My response to this has been and will continue to be one of increased focus; I have begun using a planner to keep track of all my appointments, assignments, and classes and their respective dates and times. This is something I have never been required to do, as my life was never nearly as complicated four years ago as it is now. I am certain that as time goes on my educational life will continue to grow more

complicated, and I have come to terms with this fact as I attempt to grow as a person. In high school, the teacher is the one who is, at the bottom line, responsible for his students' success. In this regard, university is a great departure from high school. The body of my professors is composed of very well educated people who are at the top of their field and who, in many cases, are required more for their focus on research than they are for instruction. Because of this, the university student must take initiative and accept responsibility for his own education. I believe that I have done this effectively, or have at least made the attempt to do so with the hope that I will be successful in the future.

In high school each class regardless of subject matter was conducted in the same style: usually some hybrid of lecture and seminar. But in a university setting, the distinction between the two types is made much clearer. Most of my classes are primarily one or the other, my STEM classes being mostly lecture based, while my humanities courses are much more of a group participation style (this class being somewhat of an exception). I, as a student, am expected to advocate for my own education and as such, my attendance, behavior (apart from interruption) and level of participation are not modulated, nor is modulation attempted. I believe that recognizing these differences will serve to augment my learning experience.

Summary

In compiling this report, in which I have written down new ideas and referenced my writing extending back over the past four months, I have come to a better and more global understanding of the process by which I will achieve my goals in a healthy and well organized fashion. I have identified the way I learn best; I can now say without a doubt that I can teach myself the material that is provided to me in written form, and when I'm learning from a lecture given by a professor I can more effectively try to assimilate his perspective.

I have identified my motivations for studying engineering. Upon realizing that my primary motivations for becoming an engineer were intellectual and monetary, I have concluded that I must join as many organizations as I can in order to make a name for myself in my local engineering community, and I must occupy my time with projects that will both

improve my skills in the areas pertinent to engineering and secure my position in the political structure of the career I wish to have.

Finally, I have identified my weaknesses. I must address in my roadmap to success my own character flaws, such as my tendency to adopt a pessimistic outlook when facing adversity and my habit of judging my own efforts too harshly. I must force myself to manage time and resources more effectively and I must focus my energies on achieving my goals rather than imagining success. Writing this report has helped me to gather a large array of ideas I had accumulated over the course of the past four months and structure them into a form that will help me to achieve my over-arching goal of graduating from my university with a BSME, and avoiding the hazard of doing so at the expense of my social, mental and physical health while still maintaining a schedule that I can tolerate and that I can afford.

References

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

[2] United States Department of Labor. "Summary." *U.S. Bureau of Labor Statistics*. U.S. Bureau of Labor Statistics, 7 Aug. 2012. Web. 24 Sept. 2012.

<http://www.bls.gov/ooh/architecture-and-engineering/mechanical-engineers.htm>