

Do You Have What It Takes to Be a Successful Engineering Student?

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What does it take to be a successful engineering student? You may think it's having a high level of interest in engineering or achieving a high GPA in high school math and science. If you have an engineer in the family, you might wonder if this means that you are genetically predisposed to being an engineer. This begs the question: Are there factors that show you are predisposed to perform well at something?

Yes, there are. Without knowing about your family history or your performance in high school math and science, we can predict your likelihood of successfully completing freshmen engineering courses - and we can predict it with a high level of accuracy. In one study conducted on freshmen engineering students at the University of Nebraska at Lincoln, we predicted with 76% accuracy which students would fail the course. How did we do that?

We started by identifying the behavioral characteristics that are optimum for professional engineering jobs. After all, if engineering students are to become working engineers one day, they will need these characteristics, too. Then we examined the behavioral styles of incoming freshmen engineering students. By comparing the students with the professionals, we confirmed that there is an ideal behavioral style for being a successful engineering student.

This ideal style may be natural for a person, or the person may need to adapt their behavior to more closely match it; but either way, the ideal behavioral style for an engineer is the one most commonly found among professional engineers and students who perform well in engineering courses.

Freshmen Engineering Students

When we compared incoming engineering students to an average of the general national workforce, we learned several things:

- Students entering the engineering program tend, on average, to be far more quality conscious than the national workforce average - about 4 times more so.
- Students entering the engineering program tend, on average, to be less people-oriented and more task-oriented than the national workforce average.

What do these tendencies mean when it comes to being an engineering major? To appreciate the characteristics of incoming freshmen and professional engineers, we examined how they operate in certain key areas of life. Knowing how you approach life helps us understand how you approach school.

Understanding Behavioral Styles

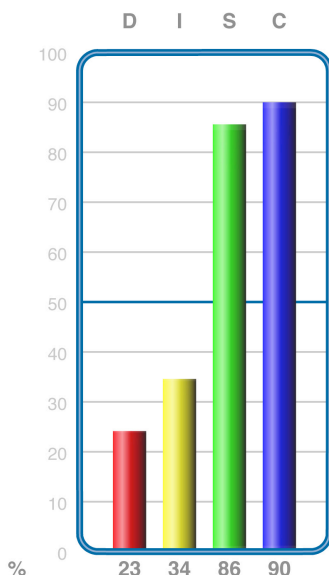
Understanding what it takes to be successful as an engineering student (or successful at anything) requires that you understand aspects of behavior that all people share.

There are four areas of life that we all experience:

- 1) **Dominance/challenge:** How you address problems and challenges.
- 2) **Influence/contacts:** How you handle situations involving people and contacts.
- 3) **Steadiness/consistency:** How you demonstrate pace and consistency.
- 4) **Compliance/constraints:** How you respond to rules and procedures set by others.

Understanding a person's natural way of operating in each of these areas gives a reliable indication of how they will tend to behave on the job - in this case, the job of being an engineering student. When you've answered the questions in our online assessment process, you'll have your own unique profile plotted on a graph like the one below, along with a full report of your unique profile. This insight into yourself will help you ensure that you're making optimum choices about what to study and how to study, and choosing a profession that suits your natural inclinations.

**Figure 1 - High 'C'
DISC Graph**



A person's behavioral style is recorded as scores on four vertical category lines (Dominance, Influence, Steadiness or Compliance). There is a distinct bar for each category, showing how you prefer to respond in that aspect of life. Various scores in this system aren't better or worse, they're just different; so a lower bar is no more worthwhile than a higher bar. They are merely a graphical snapshot of how a person tends to function in life.

Primary Behavioral Style

A person's primary behavioral style is the score that is furthest from the midline (50) on the chart, in either the up or down direction. This is the indicator that best describes how they tend to approach life. In Figure 1, the furthest score above the midline was a 90 in the 'C' (Compliance/constraints) category, so this person could be said to have a high 'C' primary style. The primary style is significant, but so is the secondary style - the one that is the second furthest from the midline, also in either direction. Each of the categories yields useful

information about how the person behaves.

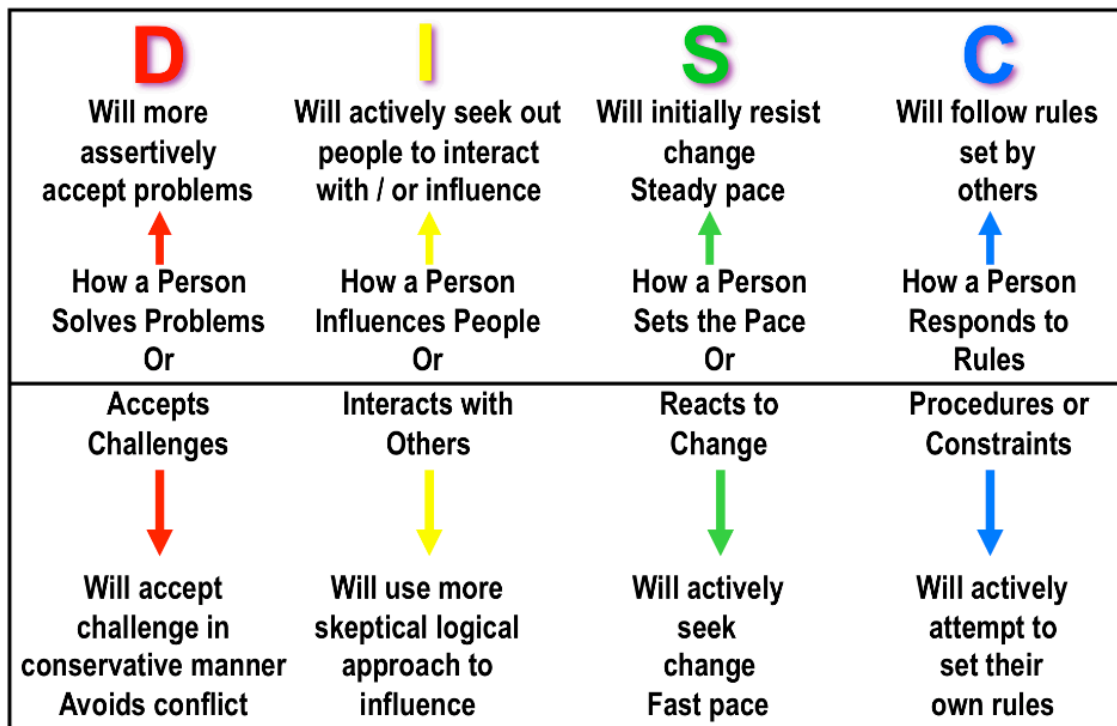
It's easy to assume that a graph with high bars is better, but it's not true. There is no superior graph, just a different graph for each person. What can be better or worse is

the 'fit' between that particular person and a specific job or role. For example, a person whose natural style makes them well suited to be an engineer might not be well suited to being a jazz musician. Everyone has a behavioral style that helps them to excel in certain situations and prepares them to perform capably in some others, but their behavioral style may also mean that they will be challenged to just keep up sometimes. It's important to remember that every behavioral style has a natural 'head start' towards performing well in certain situations.

What DISC means: The HOW of your actions and communications.

Figure 2 shows the essentials about each major aspect of behavioral style. There is more detailed information available when you've completed an assessment and are ready to delve into what it means. Looking at the basic descriptions in Figure 2, it's easy to see how our tendencies in each of these areas affect the way we communicate with those around us and why others sometimes seem so different.

Figure 2 - What DISC categories represent



Optimum Engineer Behavior

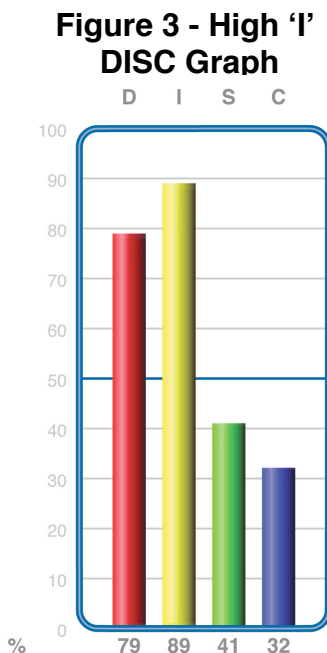
Based on benchmarks of actual engineering jobs, the ideal behavioral pattern for engineering success is high 'S' and 'C' combined with low 'D' and 'I'. What this means is that being highly detail-oriented, adhering to established practices and following the rules or procedures (high 'C') is an important part of engineering work. Having a high 'S'

means that the person is very consistent, can be relied upon to deliver the work at a predictably steady pace and will complete it in established ways. Think about it. Would you want to be the first to drive on a bridge designed by someone who wanted to throw out the rule book on testing procedures and change things up without regard for tried-and-true safety precautions?

Optimum Engineering Major Behavior

If the job of being an engineering major were to be benchmarked, it would also be classified as a high 'C' position. Sure enough, entering UNL engineering freshmen did exhibit far fewer high 'I's, and four times more high 'C's than the national workforce average. Many of them have chosen a field that is a successful match to their natural inclinations.

So it should be no surprise that the students who performed well in their first semester of classes showed this tendency. In fact, 61% of students with a 3.0 or better GPA also had high 'C' as their primary behavioral style, while only 20% of the 2.0 or less GPA students did.



In contrast, we find that lower grades correlate with the higher 'I' scores (influence/contacts), shown in the graph at the left. Words that describe the primarily high 'I' group include: sociable, talkative, emotional, personable, good mixer, popular, and confident. Fifteen percent of students with less than a 2.0 GPA had high 'I' as their primary behavior, while only 6.3% of students with a grade point of 3.0 or better had high 'I' dominance.

So while the high 'C's were working for perfection, the high 'I's were socializing, confident that their old high school success would no doubt follow them into college. Clearly, these people-oriented skills are not the ones that help a student perform well in engineering studies.

A low 'I' may well be just as important a predictor of a high grade point as the 'C' factor. A person with a low 'I' could be described as detached, analytical, reflective, calculating and critical. Sixteen percent of those students with a GPA of 3.0 or better also had a low 'I' as their primary style, while only 12% of the 2.0 or less students had a low 'I'. Similar concerns can be seen when comparing the primary 'S' and 'D' styles. Many of these grades suggest that students were not adapting for success.

Adapted Behavior vs. Natural Behavior

Is it possible to naturally have a style that's *not* the ideal style for a successful engineering student and perform well anyway? Yes. A person can adapt their behavior from what comes naturally to what the situation calls for. People do it all the time.

Every person has both a natural and an adapted behavioral style. The natural one is an unconscious, gut reaction, while the adapted style is the set of behaviors they use to rise to the occasion -- the skills they must employ to do the job. If the job requires skills that don't come naturally, then the student must be able to adapt for success.

When we looked at freshmen engineering students, only 68% of them naturally had the preferred style (of high 'S' and 'C' combined with low 'D' and 'I'), but 74% of the students with top grades were demonstrating these ideal behaviors. Therefore, the top GPA group contains an additional 6% of students who were high performing because they adapted themselves to the preferred behavior. Only 26% of the group were able to succeed without these skill sets.

Simply stated, the more you adapt to the ideal behaviors, which translate to effective study and classroom habits, the better your engineering grade point average will be. The key is adapting. Once a high 'D' or high 'I' student recognizes the need, they can learn how to adapt these new skills for success.

Adapting works very well when a person is willing to do what it takes to perform well in a course, but what would it be like to adapt oneself in a career? That depends on how much adapting the person needs to do to succeed. It's normal to make small adaptations to any environment. But if a person's natural style is not fairly close to the style required by the job, they will find that adapted behavior has limitations. The person may feel stressed, even though they are in a situation they chose. They will have to expend a significant amount of energy just adapting to the situation before they can begin to put energy into accomplishing the work at hand. The energy spent adapting could have been spent on accomplishing results in an environment more closely fitted to their natural inclinations.

This is why someone who is well suited to being an engineer might not be happy working as a jazz musician, a role that requires a high level of change and constant variation from established norms. The person with a naturally low 'C' low 'S' behavioral style will delight in discovering endless variations on a musical theme, while the high 'C' high 'S' musician will struggle to keep up.

So you could say that while some adaptation is useful, too much adaptation is inefficient. Our progress is enhanced in an environment where our natural style is the one that best matches a successful profile. To be successful at any undertaking, it's important to adapt to a successful behavioral style when necessary and choose a career area that we are naturally well suited for.