Week 10, continued

This is CS50. Harvard University. Fall 2014.

Cheng Gong

Table of Contents

Cheng's note: I've tried to capture the main points of Steve's lecture here, but his enthusiasm and energy is impossible to put in writing, and so I highly recommend watching the actual video, at 1x speed (yes, just like a regular video, because it's that good). Watch it. Do it. Now.

Welcome

- Today we have an amazing alum from the Harvard class of 1977, who was an applied math and economics concentrator, Currier House resident, Harvard football team manager, Harvard Crimson's advertising manager, Harvard Advocate publisher, who went on to Stanford Business School and then a small company called Microsoft. There, he was first business manager, then CEO, and has now moved on to being the owner of the Los Angeles Clippers. Let's welcome Steve Ballmer!

Introduction

- Steve jokes that David originally wanted Steve to give an advanced lecture on machine learning and computational thinking, but we quickly gave up on that idea!

- Today we'll talk about what Steve learned at Harvard University, as well as what he learned after he graduated.

- Steve's 99.99999999% sure today's material won't be on the final or matter in your grade, but hopefully it will matter in your life!

- The first important point is that none of the important things Steve learned at Harvard was in a classroom.

- Based on David's introduction, it seems like Steve majored in extracurriculars — which is true! Senior year Steve attended only one class, with junior year only a bit better.

- Even though that was "academically dangerous," Steve's years here were really formative and seminal.

- In 1973, Steve arrived on campus, determined to major in math or physics. He tried to take both Physics 55 and Math 55 as a freshman, and fortunately his adviser talked him out of it. In any case, he only took Physics, and after his first exam in that class, he called his parents and said, "I think I just flunked out of school." He got his exam back the next week, with a score of 33 — which made him 5th or 6th in the class. The guy who got 75 is now not only a Ph.D. in physics, but a professor in physics, and a

genius. So Steve soon learned that he wasn't meant to be a genius in physics after his first big failure here.

- Steve just finished giving a class at Stanford Business School, working with a professor who taught here and is now at Stanford. That gave him the opportunity to reflect on lessons he's learned, and it turns out that many of those lessons came directly from experiences he had while here at Harvard.

Lessons from Harvard

Ideas Matter

- The number one life lesson for Steve is that ideas matter. Most people think every idea is a good idea, but not every idea is a good idea. Most people have one good idea their entire lives — earth-shattering, life-changing ideas are rare.

- The idea that started Microsoft was that software represented a form of free intelligence, and by combining it with a microprocessor, unbelievable things would happen.

Hard Core

- Being hard core is a combination of being tenacious, passionate, and committed.

- Steve learned this lesson from math concentrators who were crazy focused, powering through problem sets that Steve would give up on after a few hours.

- That passion and tenacity was fundamental at Microsoft.

Passion

- Basketball is a lifelong passion for Steve. While here at Harvard, he used to have a job where he would attend all the games and keep track of rebounds and assists, even though he would have gone to all the games anyways.

- Finding that passion is something you can do in a unique way in college. Before college, all you did was for getting into college. But here, you can explore your passion.

- This year, Steve will attend about 200 basketball games. Back in the day, when he was marking stats in the MAC, there was a player named Lou Silver who played on the Harvard basketball team. Steve used to always give him the benefit of the doubt

on rebounds, and when Steve bought the LA Clippers, Lou was one of the first to email him, as he also had a strong passion for basketball early in life.

Own the results

- This is one of the hardest lesson for students in college to get, especially here. At the end of the day, being talented and smart is enough to get you into many good college, but that's not the only measure of success.

- You need to do something apart from making grades, measure your results, and be accountable for those outcomes since it will make you better at what you do.

- When Steve comped the Crimson, he had to sell $1,000 worth of advertisements (which was a lot back in the day). He ended up being responsible for ad sales, and feeling that pressure, particularly at the Crimson when it had no money 35 years ago, is good for the soul and makes you better at everything you do.

Treasure time

- Many people in the room would describe themselves as "too busy."

- Many seniors are probably thinking about how long they'll be at their first job, whether six months, or a year, or five years, or how long they'll like their career in general.

- Steve was involved a lot of extracurriculars, but being publisher of the Advocate was something he wasn't sure why he did, perhaps to build his resume. Since he was already involved with the football team and the Crimson, time management became an even bigger deal for him.

- Today he keeps a spreadsheet with a budget for each task, records everything he does in Outlook that gets exported to Excel, and does comparisons to see if he's on track.

- At Microsoft, he would track how many meetings he had with someone over a year, or how many hours he spent talking to customers over the phone, and measured everything because time was so important.

Storytelling

- Even if you're the most hard core, dedicated computer engineering, learning to tell a story through your work, speech, or writing is incredibly important.

- From grad school applications to getting funding for a startup idea to being the engineer on a team whose vision of a product is followed, storytelling makes it all happen.

- People don't learn storytelling in school per se. When Steve was football manager, he'd have to make announcements for the coaches, and he'd need to tell the story of what he needed to announce, and learned to give speeches through that experience.

Get in the weight room

- This last lesson is not literal, but figurative. The weight room in sports is where you get in shape and build muscle for new capabilities. In life, you need to keep evolving and building new skills, and a lot of people don't do it. Even people in the tech industry don't do it.

- Most people Steve's age learned a form of computer science where you took inputs and returned outputs that were correct or incorrect. But modern programming takes a bunch of inputs and guesses what might be interesting. That's a new skill that people who are 10 or 15 years out of college don't have.

- As an example of building new skills, when Steve was here at Harvard, he used to teach Math A, which was pre-calculus. He was already good at math, but through that experience, he learned to take concepts and explain them simply.

& Beyond

- Even though Harvard is the best institution of higher education (according to Steve, at least), he still learned many lessons after he left.

See the field

- In life, you have to be your own quarterback and see the field, instead of being tied into one thing.

- As CEO of Microsoft, everyone wanted to educate Steve on some area of technology. And this gave him the opportunity to see broadly across the field.

- Right now he's spending some time learning about government and the economy, and it turns out that there are very few sources on the total spending of the U.S. government.

The best one Steve's found (through using the Bing[1] search engine, of course) is a website run by a random blogger.

Be first but commit to be last

- In life, it's always good to be first, but the guy who wins is the guy who's doing it last. It's always good to invent a new idea, but ultimately it's committing to be successful and staying at something — almost like a corollary of being hard core.

- There are fields of Microsoft's success, like selling to large enterprises, where they started in the face of opposition (namely IBM), but now accounts for 70-80% of Microsoft's profits. They failed at something initially, but kept at it.

More than a one trick pony

- A corollary to the one idea lesson, it's hard to have a second good idea. Most tech companies have one idea, and fade to black when their idea is no longer hot. If we look back to when Steve joined Microsoft in 1980, the only other technology company from that time that is still around is IBM.

- Microsoft is a two-, three-, or even four-trick pony. Steve once said that Apple is a two-trick pony, and to him, that is the ultimate compliment.

- People with one idea are amazing, and those with two good ideas will be lionized in history for their success.

Optimism

- Colin Powell once spoke at Microsoft's executive retreat after serving as Chief of Staff, and he said, "Optimism is a force multiplier."

- Technical and smart people especially tend to be cynical and skeptical, but it's important to be both realistic and optimistic.

- Sales people at Microsoft were especially optimistic in that they were excited and prepared to succeed, because they wanted to believe.

- Optimistic engineers, on the other hand, would react with saying the world is screwed up, but that they can fix it.

---

[1] http://bing.com

Luck

- As smart and privileged as we are to be at Harvard, and as hard as we work, luck will still be a factor in our lives. Luck is important.

- You better like what you're doing, because doing something to make yourself successful will take luck anyway, so you might as well find something you're passionate about and be satisfied.

- Both Microsoft and Apple were extraordinarily lucky, with the brilliance of Bill Gates and Paul Allen (and Steve) for Microsoft, and the number of fortuitous factors that saved Apple from bankrupcy in the late 90s.

Everything is a tech problem

- Even though Steve knows he is fairly biased in this, he still thinks that everything is a technology problem. Innovation and technology leads to progress in the world.

- He recently read a book, Capitalism and Inequality in the 20th Century by an economist Thomas Piketty, and even though it is controversial and reads like a socialist diatribe, a fundamental point in the book is that GDP growth is a function of two things: population growth and innovation. Computer science drives this innovation.

- Finally, Steve would like to say, "I'm Steve Ballmer, and this is CS50, the most important class you'll take at Harvard."

Q&A

On Dropping Out

What was it like for you to make that decision to drop out and work at Microsoft? There was obviously a lot of uncertainly.

- It's 1980, and Steve was at Stanford Business School finishing his first year. Bill Gates calls, trying to recruit him as a business person. His instincts were right: the most risk-free decision you'll ever make is to drop out of college. Because colleges will let you drop back in. All his professors and friends were skeptical when they heard about Steve's plans, since software was a very new thing, and advised him to go into consulting. In fact, his parents, who were immigrants, and didn't go to college, didn't even know what software was, or why anyone would need a personal computer. And

that wasn't a result of their ignorance, but because the field was so new in 1980, when computers were still room-sized. And Steve knew that, at the end of his summer with Bill, he could go back to Stanford.

- In the first month, Steve wanted to hire more people for the company, but Bill disagreed, thinking it would bankrupt the company, and they had a fight. So they went out to dinner with Bill's dad, where Bill solidified his idea of having Microsoft be the company that puts a computer on everyone's desk, and convinced Steve to stay.

- And now, Steve can still go back to Stanford and finish his MBA. (As a matter of fact, when it comes to alumni giving, Steve is a full-fledged alum.)

On Net Neutrality

Most recently you've made a tweet[2] about net neutrality that has been unpopular among tech people, and so maybe you could elaborate on that a little more?

- That tweet got more attention than Steve expected, but his understanding is that net neutrality doesn't necessarily keep the price of internet access down. Competition is what keeps the price down, and net neutrality only decides who pays. Providers are the people who make money by providing content on the internet, and net neutrality makes all consumers pay a higher price regardless of the traffic they use. For example, someone who watches Netflix might pay the same price as someone who doesn't, under net neutrality, or we can let competition decide pricing, and having broadband providers compete in free enterprise will solve the problem much better than a few people in D.C. Ultimately, we want more investment in infrastructure that leads to better service at lower prices, but Steve is making a statement on how the world might best achieve that. And if the Clippers are successful in their broadcasts and cost viewers, and the providers, more, without net neutrality, everyone else will get lower prices.

On Owning the Clippers

What do you love most about owning the Clippers?

- Three months in, there's a lot of unexpected fun, with hearing about the team dynamics and thinking about the fan experience in the stadium. For example, in every game there's about 150 possessions, and we want to keep the crowd engaged for all of them.

---

[2] https://twitter.com/stevebmicrosoft/status/532288375668346880

The technology in basketball, too, is unbelievable, with six cameras in the ceiling that take pictures of the action, and uses machine learning to analyze the video. There's now cool software that can decide what they play was and who the player was. And on top of that, there's the economics of this to figure out, and it's actually a complicated business. Even though Microsoft had 100,000 people, and the Clippers only has 130, the problems the Clippers have are not 1,000 times less complicated, maybe 500 times less complicated.

On Technology and Basketball

How are you incorporating technology and statistics into the game of basketball, given that it's still an emerging field?

- The technology isn't quite there yet, but they look at certain plays after every game, and use statistics to analyze the probability of success at each point of the play, and whether the decisions that players have made were correct. Eventually they'll want to do this in real time, so fans can track the decision-making of the players as the game progresses. Another application is the CLIPPERTRON[3] website, where viewers can pick a player, a play, and the highlight will be played on the Jumbotron, and with Facebook and Twitter integration, your name and picture will be placed next to the clip when they play it. People love to see themselves, and eventually they'll want to do it for the broadcast on TV too.

On Jeremy Lin

Would you consider signing Jeremy Lin as a backup for Chris Paul?

- Steve supports Doc Rivers 100%, and his job is to support, ask questions, and support. "How's that for not answering your question?" But he will say, at the last game between the Lakers and the Clippers, Jeremy Lin played well, and the Clippers kicked …

On Failing

Do you have other examples of failures in your career at Microsoft that you've learned from?

---

[3] http://clippertron.com/

- Well the test he originally got a 33 on was curved to a B+, so that wasn't really a failure, since everything is relative. Steve is naturally optimistic in that he doesn't think of himself as having failed, but just not having succeeded yet. "Be first but commit to being last" is definitely something we can see with Microsoft. Getting it right early is good, but he likes to commit to getting it right eventually. There have been setbacks in Steve's life, whether in school or his career, but he believes in the power of innovation and to improve things over time. And if you've been in the weight room, preparing yourself with more capabilities, then you're prepared to take on the next idea. Football teams might not know how to beat the Patriots or the Seahawks, but they don't stop training and working out.

On Priorities

You've told us to treasure our time, see the field, and explore our passions, but how do you choose between the two, in terms of prioritizing your time?

- Well, two stories. First, as a senior undergrad at Harvard, Steve interviewed with 35 different companies, and that allowed him to get to know 35 different cultures, whether it was running a check processing room at Mellon Bank, or mine in North Dakota, or trade grain for Cargill, or help at a small insurance startup in Cleveland, Progressive Insurance, which is now a major player. Steve remembers all of these visits, and he would argue that you should have many small experiences before you get down to your passion. As a CEO, he blocked two kinds of time. One kind of time was for people in a certain country or for engineers in a certain product group, who wanted him to do something. That means he's always learning, and letting others educate him. The other kind, about 20%, was blocked off and no one could schedule it, so he could use it to read and explore. And that's how you can see the field and develop your passion at the same time.

On Products

What product have you been most excited about during your years at Microsoft?

- Well, it's situational. Steve was the development manager for Windows 1.0, and it's his favorite product and the backbone of Microsoft. Excel was also slick and interesting. Life-changing, is the Surface Pro 3, with the pen and OneNote, which lets him be

paperless and be able to ink. Steve's three children, however, would say Xbox 360 and the Halo games.

Something Special

- We've never done this before, but today we wrap up with David presenting Steve a staff sweatshirt, and make him an honorary staff member on behalf of all of CS50's TFs and CAs.

- And you're all invited to a special event, tomorrow 11/13, 12pm, at the i-lab, with President Drew Faust, SEAS Dean Cherry Murray, and Steve Ballmer.