



## The Learning Project

by Lincoln Stoller

### Hamilton Shu, Student, Engineering

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Born 1990

*"When vision comes to you, eternity is its black velvet back drop. Everything else comes out on the stage to sing and dance. Some of it fits in with the grandeur of that backdrop, and some of it only clashes, looking ugly and cheap. You end up wanting to adjust your life so that it's full of stuff that fits in with eternity, and not crammed with things that don't matter."*

— Grace Llewellyn in *The Teenage Liberation Handbook* (Lowry House, 1998, p. 69)

#### HS:

School, for me, started at home... back when I was about 3. I remember my parents trying to teach me numbers, they had these little cards and they'd hold them in front of me and ask me what number it was. I would answer them, and then that night I would go into their room and hide them so that I didn't have to do it the next day. My parents would always find them, and then I'd have to do it all over again, every day, at least three times a day. The same thing with the alphabet. It finally just drilled into my head.

The first standard learning was in kindergarten, which I thought was useless at the time. Kindergarten didn't teach me anything except not to piss off my teacher, and not to eat Play-dough.

First grade was where I actually started learning. The teacher I had gave me all these things, because I would always do the homework and excel at it. She'd give me these second grade things and I'd finish them in class. She suggested that I skip to the third grade, and I skipped to the third grade.

That was when the age issue first came out. I was almost 2 years younger than some of the students and there was the socializing issue. Most of my life I've had really good success socializing with older people. If I try to relate to people my age I really don't get much across.

#### LS:

*Did that social stuff ever catch up with you?*

#### HS:

It was always really easy. Most of the places I've been to it's, like, "Wow, you're two years younger than us? That's really cool!" That's what it's been like in every single school I've ever been in.

#### LS:

*Where do you think you got that skill? Are you the youngest child of older brothers and sisters?*

#### HS:



I only have one brother, he's my older brother. It's just always been like that. With my brother it's the same way. It's never been an issue for us. It's always been really easy for us to socialize and interact with older people.

**LS:**

*What changed for you when you jumped to 3<sup>rd</sup> grade?*

**HS:**

In third grade I learned I had incredible multi-tasking skills. I was able to do my homework, watch TV, listen to music, and keep a conversation going with my Mom at the same time. I did the same thing in class and I always use multi-tasking now. I take auditory and visual signals really well.

**LS:**

*Once you skipped ahead two grade levels did you find school interesting or fun? Did you have enthusiasm for studying?*

**HS:**

It was with my 4<sup>th</sup> grade teacher. He was the first one that made studying fun and that's where I got engineering from. He used to bring little toys to class and take them apart and show us what was inside while we were doing science. He'd tell us what this is and go, like, "You probably don't understand but this is this, and that is that." It was mechanical stuff and I really liked that. He used to work for Boeing but he quit and started teaching. That's where I decided I wanted to become an engineer.

In freshman year of high school I built my first antenna. I found out how to do it on the internet and got all the stuff I needed to make it around the house: a Pringle's can, some coaxial cable, a little connector. I put it together and felt, like, "That was pretty easy!"

Then I went through the entire house and took stuff apart. My Mom got mad at me because I would always forget to put it back together, and there would be stuff that kind of works and there's stuff that straight-up doesn't. Like our phone, our home phone.

My Mom told me she wanted a way to make it ring louder because she couldn't hear it from the other room when she's watching TV. So I took it apart and hooked everything up. Now it just makes an annoying sound when the phone rings. When someone calls there's a loud, sharp pitched sound in the house. Mom wanted me to put it back the way it was, but I forgot the process I went through to put it together.

My Dad is an instrumentation engineer. That's another one of the influences I had because my Dad was always doing engineering. He was always taking me on his business trips to engineering seminars. I started going when I was 10. I started understanding when I was 15 — well, actually 13. That's when I started understanding what they were talking about.

**LS:**

*Well, you either knew what was going on or you knew how to be quiet, or was it both?*

**HS:**

It was basically my Dad trying to teach me to keep quiet during the large settings where someone is talking. I always had something to do because when they would hand out stuff I



could play with, especially if it was an electrical engineering seminar. One time they handed out grapefruit radios; a radio powered by a grapefruit. I played with that for a good 30 minutes.

**LS:**

*Was this part of school?*

**HS:**

I learned almost nothing in school about what was happening at the seminars. My Dad would teach me, he'd say, "Today, at the seminar, they were talking about this." And I'd go "Oh! OK." And I'd ask about the parts I didn't get and he'd explain it to me.

I'm the favorite child of my Dad just because I'm interested in the same stuff he is. I have my own workbench at home. I have an oscilloscope and my own volt meter, and all that. My Dad has the resources from his company and he'd bring it home and explain it to me and I'd go "Sweet" and I'd go stick it in outlets and my Dad would go, "No, no" and pull it away from me. That was when I was younger.

When I got older I'd actually start using the tools to make stuff, like the soldering iron I have. I made a tone generator, that's the first thing I think I built.

**LS:**

*Was any of this integrated with what you were doing at school or was it all a home thing?*

**HS:**

Mostly home. To tell you the truth, I didn't learn much in public school. What I learned was all at home. That's where I learned math and science: at home.

**LS:**

*So what did you do at school?*

**HS:**

At school, I would just tolerate it and socialize. The reason my parents sent me to public school was to see how I could relate with other people, socialize.

**LS:**

*I guess they thought it was important. Did you think it was important?*

**HS:**

Pretty, yeah. Now it's a useful skill.

**LS:**

*It's surprising that you didn't get bored... to death.*

**HS:**

Oh, very much so! I slept a lot in high school.

**LS:**

*Are you good at taking tests?*

**HS:**



I'm very good at taking tests and making it look like I'm paying attention. I would just go, take tests, and ace 'em. Like in calculus I'd sleep, take a test, finish it, and then go back to sleep.

**LS:**

*You mean while the test was still going on?*

**HS:**

Yeah, like I'd finish it in 1/10<sup>th</sup> of the time of everyone else, turn it, and go back to sleep.

**LS:**

*Why did you sleep, were you tired or bored?*

**HS:**

I was tired. I would stay up late and do stuff at home because I knew I could sleep at school. Like if there was something I had to solder, or something to glue that required time to cure, I'd stay up and watch it. The next day at school I'd go to sleep from 8am to 10am, switch classes, and then go to sleep again.

**LS:**

*I'm not sure I understand what was happening at school for you. Do you remember a time when you were bored?*

**HS:**

Bored as in, like, totally bored?

**LS:**

*Yeah, like nothing to do.*

**HS:**

Yeah. This summer. I would spend 2 hours doing nothing, just sitting there watching TV. It was mind numbing. My parents were saying, "This is the summer before college<sup>1</sup>, just take a break."

I just put everything down, I just slept, watched TV, ate, went outside. That's all I did for half the summer until I decided I just couldn't do it anymore. I just had to stop.

Before the summer, during the school year, my Dad taught me some Finite Element Analysis, and I found all that really interesting. I started doing that so that at night I would have something to keep my mind occupied and that I could think about the next day.

**LS:**

*What's Finite Element Analysis?*

**HS:**

What it is, is... it takes a 3-D object made from a CAD program, puts it on a mesh so that you can do tests on it. Like, it will test tensile strength based on the simulation. It's material simulation and I found that really, really interesting.

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<sup>1</sup> The Advanced Academy, where Hamilton was taking his last year of high school, offers finishing high school students the opportunity to complete high school by taking an entirely college-level curricula.



My Dad said, “You want to see something cool?” And he installed the software and did some stuff. He had this cool wing and it showed particle flow, and it was really cool. So that’s what I’d do at night, and it would keep me occupied and I learned a little bit of flow mechanics. I stopped sitting there watching TV and being bored.

**LS:**

*What’s drawing you on now?*

**HS:**

Right now I’m helping my Dad with his patents. He’s got three patents for valve designs, two pending and one almost completely done. One’s for an electrical offset seal. It’s pretty cool. He’s got a PVC model of his seal and he’s trying to market that right now. I help my Dad with that some.

**LS:**

*What does that have to do with your next steps?*

**HS:**

It’s just something to look to. He was an engineer and now he’s making his patents. My Dad wants me to do a patent on tire sensors, something I read in a magazine that made me say to him, “Wouldn’t it be easier if this?” and I drew a picture. And my Dad’s like “Just do it!” (Laughs) And I’m like “OK, I will!”

So I went on CAD and drew basic sketches, and my Dad was saying “This looks good but…” and he’s showing me what’s wrong. And I revise it and he keeps pointing out what’s wrong. And that’s what I’ve been doing when I go home every weekend.

**LS:**

*Do you think that you’re more stimulated by that than what you’re doing in school?*

**HS:**

I think I’m equally stimulated because I’m learning the mechanics behind flow in physics now, I’m learning all the mechanics behind what I was doing in Finite Element Analysis. I feel like I’m really learning some new stuff, because I never learned physics at home. I learned basic mechanics and ohms and resistance, but I didn’t learn that much physics. Now I’m learning physics and I think it’s really fun. We have labs every week, springs and carts, friction pads. It’s pretty fun.

**LS:**

*What are you planning to do with your college degree?*

**HS:**

I’m going to get a bachelor’s in electrical engineering first. Then I’m going to get my doctorate in instrumentation and automation. My Dad has the same degree. My Dad’s job is pretty fun. He does a lot of things: he programs, he does mechanical design, and he also does electrical design. And those are the exact three things I want to do. I just want to do what my Dad does now. I think it’s a really cool job.