

Woz There, Done That

All Steve Wozniak really wanted to do was impress the other electronics freaks at the Homebrew Computer Club. It just so happened that one of those freaks was another Steve — Steve Jobs.

It was the mid 1970s, and the two Steves actually had met before, in the summer of 1973, while Jobs and Woz (as he's popularly known) both worked at

Hewlett-Packard. From the start, Jobs knew he was not nearly the engineer that Woz was. But he believed he could parlay his friend's genius into a big idea.

**Apple
co-founder
Steve Wozniak
says good
technologists
are the best
marketers.**

Woz wasn't so sure about that, but his friend turned out to be a pretty good salesman, and the Steves launched Apple Computer on April Fool's Day, 1976. The date was no accident. Woz is famous for his love of practical jokes, most famously his prank phone call to the Vatican, posing as Henry Kissinger. He almost got through to Pope John Paul II.

Woz actually placed that call to test a so-called "blue box," which basically hacked the phone system to enable free calls. Technically, it was Apple's first product, and some of its technology was later used in developing personal computers. Anyway, by 1980, Apple had gone legit — and public — and its co-founders were rich and famous. You can enjoy the full story in Woz's recent autobiography, *iWoz* (W.W. Norton, 2006).

Woz never cared much for his celebrity. All in all, he'd rather be playing Segway polo or training for the 2007 Nathan's Famous hotdog eating contest. But we were lucky enough to snag about an hour with him and he shared with us his insights into innovation, computers, marketing people, making jokes, learning from kids and why he loves the Prius.

Do you think of yourself innovative?

Gee, I don't know. Let me think about that. I don't know if I'd use that word... *innovative*. Okay, yeah—innovative. Absolutely. Back in the days of the early design of the Apple stuff—innovative, absolutely.

What I would do is look at the world and how other people were doing things. I just don't like conflict. I don't want to compete. I don't want to try to do the same thing better. So I went off in very different directions than what was obvious.

It's like if you're building a house. You're building it out of lumber and making connections in certain ways. I had techniques of just using different parts in different ways than what they were intended for, but wound up with simpler, lower-cost solutions.

What were some of those techniques?

I would take a chip that was designed to rotate numbers and I would use it instead to put out the right pulses and timing sequence for a RAM. I did that because it saved parts. I came up with all these little tricks to use different parts in ways that you just couldn't find in a book.

I think it helps to have a prepared mind. So here was the world in 1975, and a whole bunch of people were trying to make money on low-cost microprocessors and build computers with switches and lights—like every computer ever had been.

I always had a strong internal philosophy of trying to design things for normal, average people. More than that, I like to skip and jump to the spot needed and get straight to the point and do what's needed.

How did you think of using a keyboard with a computer?

Keyboards had been used before with expensive microcomputers. For me, I knew that if I could write a program and type it into a keyboard, it was a way for me to test my work. Or, I could type in a game, and have fun.

Basically, I needed a keyboard to type programs



in and I needed output in the form of a video terminal. Input and output are the most expensive things. Output is by far the most expensive thing. I had to use the only output device I could think of, which was my home TV.

So, I built a terminal where I could type on a keyboard and watch letters on my TV set and talk to a computer in Boston via the arpanet, which was the early internet. All I did was show it off to a few people... like Steve Jobs. And he actually arranged for us to sell some.

Yes, just a few! Was playing games your motivation?

I don't know if *motivation* is the right word or *justification*. All of the inspirational talk about what computers were going to do for people in the world—for education, for communications—games were a part of that. But playing games was more a little bit of an excuse.

Back in those days, I had a book called *101 Computer Games*. I was amazed because all of the games in this book were written in BASIC. When I wrote a language for Apple, that influenced me to write it in BASIC instead of FORTRAN, which was the scientific language.

I had never programmed in BASIC in my life but being able to program these games in BASIC told me that it was going to be the language that was going to be more popular.

Do you find it hard to get along with marketing people?

No. I'm not a conflict-driven person. When I was at Hewlett-Packard there was a lot of grumbling over great ideas that engineers had designed but marketing wouldn't want to put out because they thought they wouldn't sell. So, I had it in my head that marketing opposes engineering, but I never fought with marketing.

When we started Apple, Mike Markkula was funding us and I respected him so much. He said that the top companies are marketing driven, not engineering driven. I totally bought into that. I worked alone and I was marketing. When you're building a product that you're going to use yourself you can be very good at marketing.

Is there much room left for innovation in personal computers today?

It's so difficult to say. We just had a Macworld Expo and we introduced the iPhone. Well, you could say, that's not a personal computer. But everything is a computer inside. There sure is a lot of room in that consumer electronics area but it's really how you bring the computer in, sort of invisibly. The more invisible you make it, the better. So it seems like a phone but it's really a computer.

The amount of innovation is definitely not what it once was — especially when we started personal computers in those first five or ten years. God, almost anybody — a small group, one person, even a kid in school — could come out with a product that just shook the world and computer technology was changed forever. That would happen one day and then it would happen the next month, the next month and the next month after that. Every product was so astounding. That doesn't happen anymore.

What has changed?

Today, you pretty much know what a product is going to do and you have to look for tiny little details of user interface to prefer one over another. It's gotten to a point where we can't be sold new products just because they're better. Maybe something that's so great — it just hits the formula perfectly like the iPod or the iPhone.

But I'm used to my particular computer platform. I'm used to my email program. I'm used to which program I use for this or that. It's hard to get me to switch because it's hard to come up with something that changes the whole world and gives me more than I had.

That's why it's hard to market a new operating system nowadays. Apple's Leopard and Microsoft's Vista — it's like, well, you're not going to change my life very much just with operating systems.

Is the iPhone innovative?

Extremely. More than that it represents my high ideals of people being more important than the technology. I'm a gadget freak, so I've had every single smart phone. I try them and I keep them for weeks and then I give them up. They are always too messy and it is too complicated to do the setups just to do simple things. When I bring up web pages and email they're kind of difficult to read and to find your way around. The internet was really designed for the beautiful computer screens.

But now here's the iPhone, doing it the right way, the human way. Here comes a whole web page and, yes, it makes sense to me — it's what I'm used to on my computer. That's just so far from a little phone with a little window that you have to kind of scroll around to see the text... and there's weird ways to get the graphics but there are extra steps in that. Forget it. I want the real thing. It's like Steve Jobs' phrase, "the real internet." That just makes so much difference.

Other than Apple, do you have any favorite brands?

No. I used to like Sony, but definitely not now. Bang and Olufsen — I like the style of their products. I love the Hummer. I use it for certain off-road tasks and carrying a lot of stuff. And the Prius — oh God, I love the feel of that car. That's just the car of my life. I've never loved a car as much as the Prius. Dinky car as it is. I've had great, great cars — and I still do — but I just love the feel of the Prius.

I even drove three Segways, in my Prius, up to the Macworld Expo. Just slid 'em in. Didn't have to disassemble them or anything. I could have fit four in except I also had three passengers — three passengers, three Segways. No problem at all.

It gets 40 miles to the gallon but I don't care about the mileage. That's a bad way to think about it because most hybrids use more of the earth's resources than if they weren't a hybrid. You have to weigh the extra

cost of the machine in terms of the dollars' worth of resources they use.

The advantage of a hybrid actually is that it's low polluting. They actually tune the electric and gas engines—in the United States particularly—not for gas mileage, but for low pollution. And I think that's very good.

Have you applied innovation to anything other than technology?

Oh, I like to think up jokes! I consider myself pretty good at that because I do it a lot. I like to switch letters in words and play word games. Sometimes I say, *ok, a new size tv or tv is the new wake zone*, which are anagrams of my name.

What else do I do? Hard to say. Part of my shyness just led me to try to do things a little different than other people so I'd have something to stand out. Doing something different was my primary way to communicate.

What's the connection between making jokes and innovation?

Making jokes has an element of creativity because you have to be able to think a little different way. You have to be able to say a sentence that misleads people, that leads them along one track and then when you give the punch line, they see that—*ah, ha-ha, how funny*—because there was a different meaning than what they were expecting.

That's like when you're designing something new—a way that hasn't been done before—because you're going off on a different track than before and yet it converges and does the job.

You like to work with kids.

Yes. My whole life I've had this orientation that we should be as good as we can to kids because they're the future. My dad got me thinking that way when I was very young. So, I decided I wanted to be a fifth grade teacher. I decided this when I was really young. You know, you tell your parents, what you're going to do in life and I was going to be an engineer first, but a fifth grade teacher second. I kept that little dream in me.

Whenever I saw people—maybe it was mothers—working really well with a kid, doing some little games or tasks, I always admired it and was envious. And I always wanted to teach. I wanted to get a teaching credential. After Apple happened it was hard to

get back to doing those things I wanted to do, but I did it. I just decided I was going to do it and nobody stopped me. I taught fifth grade for eight years.

What did you learn from kids about innovation?

Occasionally they did innovative things without really knowing what they were doing. I admired that. Some kids were better at that than others, and they weren't necessarily the brightest kids in the class in math. They would just sort of discover a way to make an arrow move in a program and I'd say, *you can't do animation in this program*. And then they'd show me the technique and I'd say, *whoa, it works!*

I tried to encourage them to think. Sometimes part of innovation is that you have to try to do things that might be impossible. You have to try to think in those strange areas and not be told *here's exactly what you do* or *here's exactly how you think*—which is the way most subjects are taught in school.

Where do you do your best thinking?

God knows. I don't think that much anymore. Just laying in bed, falling asleep, waking up. Or, oddly enough, my best jokes come to me while I'm in the shower. I don't know why. Maybe residing overnight just got me in the right mode where my head is working that way. It used to be that I woke up in the middle of the night with a lot of problems solved while in dreams. That was when I was younger. That doesn't happen anymore. But I'm so busy and tired all the time now that it's not the same.

Sometimes I come up with great ideas while I'm driving. The problem is that if I don't write them down I forget them. Talking with smart friends. That's number one. You rap off an idea, they say something, you think of another idea. You get your head going in its own creative mode.

You don't prefer to work alone?

Yeah, but I wouldn't have designed the Apple computer—even though I was good at working on my own—if I didn't have the motivation and inspiration of the Homebrew Computer Club. The most important thing in my life was that meeting, every two weeks.

I never once raised my hand. I never spoke because I was too shy. I sat in the very back row. But I listened, and boy, it inspired me to make me think we were doing something worthwhile for people in the end. ■