

**Sue Nelson**

Hello, I'm Sue Nelson and welcome to the Create the Future podcast brought to you by the Queen Elizabeth Prize for Engineering.

[Music]

Ken Kocienda invented the autocorrect for the original iPhone and was part of the team that created Apple's Safari browser. He's worked on all manner of products during his 15 years as an engineer for Apple, including the iPad, the Apple Watch, and the iPhone, most famously enabling a virtual keyboard on a phone screen. Ken is also the author of the book 'Creative Selection Inside Apple's Design Process During the Golden Age of Steve Jobs', a man whose name will definitely crop up during our conversation. More recently, Ken became the product architect of a company called Humane. And that's all a little bit hush hush at the moment, as we'll hear later, but let's start with that job description, Product Architect, which, to be honest, sounded a little bit like something from The Matrix.

**Ken Kocienda**

A Product Architect in the context of the company that I'm working at now, is a job where we think about what the product will do for people. What's it for? So much of the work that I've done over the course of my career has been based in software, but the software interfaces into hardware, it has an environment that it's running in. So, there's this technical aspect to it. But ultimately, what we're trying to do is serve people out in the world who are maybe going to be interested in bringing a new technology product into their life. Well, why would they want to do that? Well, it's the job of the product architect to think about the product in those terms and to have the technology work up to meet people where they are.

**Sue Nelson**

It sounds like the fact that your background, you know, you haven't got an engineering degree, you've got a history degree. That sounds like it's probably being a huge advantage for what you're doing and the way you approach different designs and products and thinking about who's using it and why am I doing it, and what's it for?

**Ken Kocienda**

It is. It was, in the earlier part of my career, as you might imagine, it was a barrier in some ways, because I simply needed to learn through some other means. My craft, what can you do with programmes? How do computers work? What does it mean to write a good piece of software that is efficient, and maintainable and does the job, is fit for purpose? That was a big challenge. And it took me a long time. But once I brought myself up to a level of competence in engineering, then what you said, yes, I then had the advantage that I could bring this this other view to what we were trying to accomplish in terms of making a great product. You know, there is a couple of things that that I learned I was very, very fortunate for many, many years to work at Apple over 15, almost really 16 years. And to be at Apple during the time that Steve Jobs was the CEO and being our Chief Product Architect. That was that was his job for sure. And one of the things that Steve would always say is that Apple throughout its history, worked at the intersection of technology and the humanities, and trying to really understand what that means, that there is a whole history of creative work of culture, of bringing together culture and technology. We don't think of say the printed book as a technological artefact, but back in the 1450s it was at the cutting edge of what people could do to share information with each other. And so you know, I try to be aware to be mindful of that aspect of what I'm doing now with my work to make a product in the in the present day.

**Sue Nelson**

And before we get into your Apple career, it's really interesting that early stage of your career, because your first, sort of move after your degree. When I first read about it, I really did a double take because it involved two wheels?

**Ken Kocienda**

Well, I got my four-year history degree at Yale University in the US. And when I came to the end of my degree programme, I did not know what I wanted to do. I was confused. And so, I tried something new and different, which is to go and apply to a motorcycle mechanics course. A programme where, yeah, I was on track the idea was to train people up from nothing from scratch to work on motorcycles. And you know, the directional blinker doesn't work and to figure out how to fix it.

**Sue Nelson**

Did you ride a motorcycle?

**Ken Kocienda**

At that time, I aspired to. But yes, I so I moved from the east coast of the United States, which is where I grew up, I grew up in the New York area on the east coast. And Yale is also an east coast in Connecticut, not far away from where I grew up. And I moved for the first time out west, you know, this, this idea that has been a core notion in the American experience "go west, young man", and so I did to Arizona, which is where this programme was, and I lived out in the desert, just outside of Phoenix, the school was actually in Phoenix. So, you know, it was an experience where I started something where I did not know what I was doing. And it was that process, which, which then helped me later when I came to technology of trying to learn what it is that I needed to know, to accomplish the goal that I set for myself.

**Sue Nelson**

And what was your goal?

**Ken Kocienda**

I had a vague notion that I might join up my history degree and the writing skill that I had developed and perhaps go work at a at a motorcycle magazine, you know, they've got these monthly magazines, you go to the newsstand, they still exist, they certainly did back in the late 1980s. When I was thinking about this, I didn't get very far down that road, mostly because I ran out of money. And eventually that would that was an interesting try, but ultimately not a success.

**Sue Nelson**

So how did you know, because this is the very early stages of software engineering at that really interesting level where everything was changing, and was new, it was upturning software engineering that had worked perfectly for decades. And now those big changes coming on, was it the novelty of it that appealed?

**Ken Kocienda**

At that point in my life, you know, looking back, I had an aptitude for computers. At Yale, there was a distribution requirement, it was called where we needed to take courses outside of the area of our focus of our major, and I took a computer engineering course and passed it easily and got an A and didn't think another thing of it. And I didn't realise then that that should have been a sign to me that this was something that I enjoyed doing that the time just disappeared, and I was fully engaged in the work. And it was many, many years later that I decided to listen to that little voice in my head that was telling me, "you know what, this you find this interesting". And so it was just part of a journey of for me of trying a lot of different things, you know, history,

and then motorcycles and then other things that came afterwards, before I really fixed on technology as being the linchpin, you know, the really the centre of gravity for my career.

**Sue Nelson**

Do you remember your interview for Apple?

**Ken Kocienda**

Oh, yes, I remember it very well. I was very, very nervous. And I had an interview one day with a fellow named Scott Forstall, who worked very, very closely with Steve Jobs, both at Apple and at NEXT previously. Now this was 2001. So, Steve Jobs had returned to Apple at the end of 1996, early 1997. So, it was just a few years into his return. And to give some, you know, you know, to put that into terms of products, the iMac, the candy coloured, computers had come out, but the iPod still had not. And then the iPhone was still years in the future. Apple was still struggling with 5% market share in a world that was dominated by Microsoft and Windows. You know, it was still the era of desktop computers. And yes, there were some laptops as well, but it was still largely desktop operating systems, you know, coming through from the 80s and 90s. And that's what ruled the roost and in the world of technology. So, I came to Apple that three months before the iPod was released. And I had this interview, which is really what your question was so I'll speak to that. It was fascinating because I got asked questions that I'd never really dealt with, in the same way they you know, and they were there along the lines of our discussion now is like, what is it all for? Why are you interested in technology? You know, what role should it play in people's lives? And how can we here inside the company, do work every day that will somehow have a pleasant influence to people outside the company. Scott Forstall had this, the analogy that I use is that he was like a boxer. And the interview was like the bell ringing, 'ding', the round begins, and he comes across that you metaphorically, of course, intellectually, emotionally, and he just starts pounding away, and you're just doing the best that you can to defend yourself and to parry and to maybe sneak in a couple of blows of your own. And it was, you know, an insight, an initial experience of seeing what it was like to be on the inside of Apple to be in this incredibly intense environment where you are put on the spot, you're asked hard questions, and it's your job to figure out good answers. It is sink or swim, I was utterly I was utterly taken with it.

**Sue Nelson**

And so, when you had to demonstrate your first bit of software to Steve Jobs was that a similarly, sort of, in the boxing ring experience?

**Ken Kocienda**

It really was, Steve Jobs was the most focused, intense person I have ever met, it's not even close. And he knew exactly what he wanted, and demoing to him. And to describe what I mean, when I say demoing, what we did was we had the software room, where Steve would come every Monday, and he would see the latest software that was in development. And various projects would be in different phases of their level of finish, their level of polish. Sometimes in the early stage of a project, the work was highly speculative, and really just a little bit of a sliver of what it would become eventually. And he wanted to be in touch with that. He thought he saw his role as CEO of the company, to make sure that the products were great. So, he wanted to see throughout all of those phases. And what he did was he called on individuals like me, I didn't have any team at all, I was not a manager, I was an individual contributor. And I was working on a particular project, let's just pick out one, for example, which is the iPhone, let's say one time, one of the first demos that I did for him was to show a new set of fonts that we were looking at, for the new screen, which Apple came to call the retina display where the pixels were actually too small for you to make out with the naked eye. And what we could do to make more beautiful fonts to highlight how beautiful and sharp and crisp and clear this new screen was. And the first demo that I had was terrible, because we just didn't have a good set of fonts. And so, Steve had this way of looking at the work, and utterly absorbing himself into it. And doing what I alluded to earlier is putting himself in the

perspective of the customer. And he hated it. He hated what I brought to him. And he turned to me and he said, you know, he actually used a word that I won't say, he said, "well, this is dog doo doo". But then he did something remarkable next was he said, "what are we going to do about it?" and so it wasn't accusatory, he didn't say that "Ken you are" some expletive. You know, he didn't call me a name. He called the work a name. But then immediately he turned around and made this inclusive statement "what are we going to do about it? what do we want to do?" and it immediately changed to being something that could have been a moment where the CEO of Apple one of the most famous product people in the history of technology cut me down to size. And instead, he brought me in and expressed confidence that we're going to get to the bottom of this and we're going to find a way to make something beautiful that then he himself, Steve would turn around and hold up on stage in some big keynote, you know product, Introduction presentation, and tell everybody, "here's this wonderful new thing that we made". And eventually we did it took one or two more rounds of demos and rifling through libraries of fonts to find one that would work in the ways that we were all satisfied with. And that's what we did. It was this long iterative process where sometimes you're up and sometimes you're down. I probably saw him six or eight times. And each one of those moments is very, very valuable to me. And one of the reasons why I wrote my book is I wanted to remember, and the act of writing for me was an act of remembrance, largely, others weren't so lucky with Steve, there were other folks who spent a lot of time with him. And yeah, he could be, it wasn't always a positive aspect.

#### **Sue Nelson**

It obviously had it made a big impression on you. And you have to be fairly robust, I think, to take that criticism. Do you think software engineers need that, they need to have that level of strength?

#### **Ken Kocienda**

Well, hopefully, no one who's listening now will ever be on the end of anything like a Steve Jobs tirade, I don't think that those are really constructive. And yet, I do think that to do the kind of work that I've done in software and product development, you do need to have a thick skin, you really do. It's not enough to present a piece of work and tell people "I worked really hard on this" and expect that to count for anything. In the end, the work has to be good on its own merits, the people that you're trying to deliver the work to, don't care about how hard you work, that doesn't matter to them. You know, there's an idea that, I had an old but a long time ago, I had a photography professor who talked about mud pies, he used mud pies, as a metaphor, is that when you're when you're three years old, and you're sitting in the gentle surf down at the beach, and you build a mud pie out of the out of the sand, your parents will walk up to you and go, "Oh, that's so wonderful". And all it is a mud pie. But they love it just because you did it, right? And that's all, it doesn't matter how it turned out, just the fact that you did it is wonderful. And as we grow up, we need to shed that. And to use this this metaphor of two hats, again, there is there is a moment that you are in the midst of creating the work. And you're wearing the hat of the product developer, the software engineer, the product designer, what have you. And then there's the moment where you have to switch hats. And now you're an evaluator, you're an editor, you have that hard critical eye that you're applying to the work and you need to decide if it's any good or not. You decide what's good, you hold on to that you decide what's not so good, you figure out maybe how to mitigate or even eliminate that. And then you switch out again, and you dig in, and you try to come up with the next iteration. That is the only way I know of how to do good work.

#### **Sue Nelson**

And what was your day-to-day work? Was it a more structured nine to five at Apple?

#### **Ken Kocienda**

There certainly was an aspect of the game room, we had some 80s you know, coin operated arcade games set aside in one place. We had a, you know, an American pocket billiards table set up. Yeah, there was that, that

that aspect to it. And we had snacks and, you know, in a very nice cafe on the campus, and it was beautiful trees and landscaping and all that. But I found that the people that I worked most productively with didn't really make as much use of that as you might think we were really focused on the work. That's what our love was, we didn't work at Apple because they had snacks.

**Sue Nelson**

Or you got free smoothies.

**Ken Kocienda**

Yeah, right, so that wasn't it. We were completely taken up into work and the opportunity to create these new technology products and try to make them great.

**Sue Nelson**

And what were the challenges of being innovative effectively, I mean, it must have been very exciting knowing that what you're doing hasn't been done before, you're doing it in a different way. Particularly when it came to, sort of developing the first software sort of keyboard for the iPhone, for instance, and autocorrect as well.

**Ken Kocienda**

Right. So we had a little bit of a joke at Apple where we took a sheet of paper at one point and printed out the word 'innovate!', you know, in 72 point type and you know, just pinned it up in the wall, as if that was how it happened, that somehow you could just will yourself into creating new things, or you know, have a motivational poster that puts you into the right frame of mind. But not surprisingly, that's really that's really not it. And so let me speak a little bit about the trick that we did with the iPhone, 15 years ago from this perspective, when we're speaking today. Some folks at Apple Steve Jobs included but some others product designers and developers, but a very small group, a handful, looked around and said, "Wow, we're manufacturing these iPods now in their 10s of millions, so we know how to make a small handheld product that will fit into your pocket. Boy, battery technology is getting a whole lot better. Goodness, this network is now pervasive, it's coming online where you can get the internet everywhere. Wow, there's that too. Huh, there's this multi touch technology where maybe you don't, you're not going to keyboard and mouse anymore. Now maybe you can use your finger to interact with the screen. Hmm. And now CPUs, the actual the brains of the computer are powerful enough that we can get a sufficiently low power computer that can maybe drive a whole graphical user interface on a handheld device". Given all of that hardware, those pieces, what could we do if we bring those pieces together with software, use software as the glue as the mortar to take those bricks and build something out of them? That was, what made the iPhone successful, was our solution to that, what we built the way that we integrated all of that hardware with software was the secret, so that it was this newly integrated thing that was greater than the sum of the parts that you take A and B together and you create C, it's not just a A-B. That would, that was the key to us at Apple, that was the secret to a great product like the iPhone.

**Sue Nelson**

It revolutionised as soon as it was out and successful. I just remember sort of within the year seeing cheaper knockoff versions everywhere who are trying to copy it, and it was never as good. It never worked as well. You've done some, you know, pretty incredible things - is there one particular piece of work that you think all I you know what that was something I'm really proud of I did that?

**Ken Kocienda**

Well, I am most proud of my work on the software keyboard for the original iPhone, the notion of autocorrection. The idea that we could put this small software keyboard on this device, and that it would be a means through which people could communicate. The way that I like to tell this story is that, in the before times

before the pandemic, when we used to more routinely take airline flights, I used to really enjoy the ends of the flights, right as we're coming in for a landing. Once the plane touches down, and then the flight attendant comes on and says "okay, you can now use your electronic devices". What do people do? So many people I would watch on the aeroplane, people would take their phones out of their pockets, they would turn them on the phone would register on the network. And then they would use my software keyboard. If they had an iPhone, to type out this little message to a friend, a loved one, a family member in the in the terminal "just landed see soon love you". Right? This wonderful little human moment where people use the technology that I helped that I contributed to, to re-establish this human connection to their loved ones, that for them this was not a technology experience. This was a human experience, getting in touch with the people that they hope to see really soon once the plane actually finishes taxiing and they can walk down the runway and join back up and resume their lives. And to be a little part of that, to be the means that people could just that couple of minutes earlier get through to their loved ones is you know, I'm just very proud of that. It's the goal realised. That's why I do the work that I do, to have technology be a facilitator, a conduit, a way for people to have more and better experiences than they could otherwise.

**Sue Nelson**

It's lovely to hear. And it's something that, it's a quality that so many engineers have. Everyone always says I like solving problems, but they also seem to have this ability to want to make life better in whatever aspect it would be is to sort of, "well, how can I do that? How can I make that easier?" and it is about human connection? You're exactly right. And when we've touched on some of the qualities that an engineer needs in terms of like resilience, I suppose effectively and the ability to take criticism and build and learn from that. What would you say the sort of best qualities or good qualities for particularly in your area software engineering?

**Ken Kocienda**

You know, we've touched on it. It's to figure out what it's all for. How can we bring together Find some purpose for the work beyond the work. Ultimately, you can't describe or conceive of the work in terms of itself. So, to think about how the things, you know, for myself, the things that I create, can reach out outside the world of technology. You know, software is such a plastic medium, it can be whatever, it's not bounded as so many other engineering fields. So, you know, say civil engineering, you're building a bridge, well, there are some hard constraints, that that just don't exist in quite the same way in software. So, I try to lean into that, to try to make work that people will be able to use, say, for art, or for writing, or the example we just had for human communication. Photography is something that, you know, the modern smartphone has completely changed.

**Sue Nelson**

Oh, absolutely.

**Ken Kocienda**

We have so many more photographers. And so, this democratising aspect of the products to me is absolutely wonderful. So those are the kinds of aspects that that I think that people should strive for.

**Sue Nelson**

I saw that you tweeted the other day, one of the most underrated skills is the ability to say, "I don't know". Have you ever had to say, "I don't know"?

**Ken Kocienda**

Oh, goodness. I think that maintaining a very strong sense of humility is a very important way that I go about my life and undertake my work, there is so much that I don't know. And if there are, you know, people, perhaps even young people listening in who are at a stage of their career, where they're still aspiring, rather than me, I'm

at the stage of my career where I can look back at accomplishments, if you're maybe more at the earlier stage of your career, and you feel that there's so much you don't know, don't worry. That is how it is for everyone. And so much of the work that I did at Apple, the work that I've done throughout my career is this journey of trying to figure out answers to questions where the answers aren't obvious. And yeah, I don't know, a lot every day. But once we're done recording this podcast, I'm going to get right back into it. That's the job.

**Sue Nelson**

Do you think someone today could reach your heights through a similar, slightly unconventional route?

**Ken Kocienda**

Well, it may take a while. But yes, I think so. We are so early on in the ark of technology, there is so much work to do. I think that the pandemic highlights how much we've struggled with video calls and remote collaboration and communication. There is there is still so much that we can do. And yet the promise of the technology the simple fact that that you and I can have this discussion, just you know, in a browser tab is pretty remarkable. It shows that we have come some distance. And yet if we think about how different than the experiences of being in the same room with somebody and having a conversation, and what can technology do to bridge that gap that still exists? It's just one small area that shows there so much to do. So yes, young people absolutely have the opportunity to go out and make great products of their own things that will astound me, I'm sure.

**Sue Nelson**

And I know there may well be some commercial sensitivity, so you can't go into too much detail. But give us an idea or a flavour of the sorts of things that you're working on at the moment?

**Ken Kocienda**

The company I'm working on now is not something that I'm prepared to talk about in any great detail. But we're doing consumer technology, bringing together hardware, software, and services. And we're trying to figure out well, what would be a great new technology experience for people? How could it be better, we think there is a potential to make things better along the lines that we've been talking about. And I don't have details to share about what that is now.

**Sue Nelson**

I'm sure it's going to be great.

**Ken Kocienda**

But I am thrilled about it. And every day and I'm working together with some really, really wonderful people. And we're hiring. And when the time comes, I'm sure you'll hear a lot more about it.

**Sue Nelson**

I'm sure we will. Ken Kocienda, thank you so much for being on the Create the Future podcast.

**Ken Kocienda**

Thanks so much for having me.