

# DTM Podcast #2: Co-evolution

## Show Notes

This podcast is the second part of an interview that features Kees Dorst, Professor of Design, from the University of Technology in Sydney, Australia. Further details about Kees can be found in the show notes for the first podcast. The interview is followed by a discussion between Peter and Mieke, who talk about some of the ideas in the interview that they found interesting.

The second part of the interview focuses on the idea of ‘co-evolution’ that Kees developed along with Nigel Cross in their 2001 paper: [Creativity in the Design Process: Co-evolution of Problem and Solution](#). This is the idea that designers explore problems (or ‘problem spaces’) by proposing solutions. Kees starts by contrasting this type of thinking to more ‘linear’ ways of working, before going on to talk about how this kind of working can be difficult to understand for others in organisations and what to do about it.

Several of the ideas that Kees talks about will form the subject of future podcasts – what it means to acquire experience and expertise in design, for example, and how to get others to participate in design processes.

One reference that is mentioned in the following discussion between Peter and Mieke is a famous paper by Jane Darke: [The Primary Generator and the Design Process](#). This is a study of how expert architects generate very quick solutions to architectural problems when they visit the site of where a new building should be. That is, they develop an understanding of the problem through thinking of a solution – co-evolution, in other words.

Right at the end of the discussion Mieke refers to the idea of ‘provocative prototypes’ – prototypes that deliberately try to provoke a better understanding of the problem in social design contexts. You can find out more about this in her recent paper: [Problem Framing Expertise in Public and Social Innovation](#).

## Podcast Transcript

### INTRODUCTION

**Peter Lloyd:** Hi Podcats! I'm Peter

**Mieke van der Bijl:** Hi, I'm Mieke

**Peter Lloyd:** And this is the second DTM podcast. This is basically the second part of an interview with Kees Dorst. The first part was on reflective practice. If you haven't yet listened to that I'd recommend going back and listening to that before you listen to this one. This is quite a short interview that we did on a subject called Co-evolution, but it's distinct from reflective practice so we thought we'd have it as a separate podcast. What we're going to have is about a 10 minute interview with Kees Dorst, carrying on from before. And then another discussion about some of the things that he talks about and some of the theories that he mentions. So let's hear the interview...

### INTERVIEW

**Mieke van der Bijl:** So we've been talking about reflective practice and about framing. The last thing I wanted to talk about is the idea of co-evolution of problem and solution. So there is a very well-known journal in our field, Design Studies, and one of the most downloaded papers in that journal has been for many years for the paper you wrote together with Nigel Cross about creativity in the design process and the co-evolution of problem and solution. What does that mean - co-evolution of problem and solution?

**Kees Dorst:** The history of that paper came out of the work I'd done studying these expert designers. I sort of realized that what they're doing is really interesting. Let's say in the classic problem-solving way of looking at design, you start with the design brief and then you do all of your design work and you get to a solution and heh you're finished. But if you look into those design processes, yes, you start with a design brief and you come to a solution, but you realise that it's not quite the right

solution and you actually need to go back and look at the problem slightly differently because you've hit a dead end. Then you go and create another solution. So the problem and the solution are both moving in design, which is different from what often happens in engineering. In engineering people tend to work in a fairly rational problem-solving, fairly linear, way. But in design the problem and solution are both in play they can both change. I think that's a key aspect of what design can bring to other fields at the moment. A lot of fields, we are very, very stuck. We're not solving our problems very well at all. And you can say, well, that means that we need to hire designers to make more solutions. Or you can say, well, we need to actually hire designers to help us through the possibilities that there are and to also look back at the problem and see how that shifts and changes. So that's a key aspect of what designers do. Studying it in detail you realize that an idea is not a new solution. An idea is actually a kind of bridge, a link, between a certain view of the problem and a solution. Because design is very propositional. You go 'ok IF this is the problem, then that could be a good solution', that doesn't work, bla bla bla. OK, let's change how I look at the problem a little bit. Hey, wait a minute. There's a solution there - YES. And that's the sort of adrenaline rush that you get when you have an idea. Is this kind of feeling of 'click', something clicks together, and what clicks together is actually a view of the problem and a possible solution. And a bridge between those is what we call an idea.

**Mieke van der Bijl:** So it's the fit between the problem and the solution. One of the things I always find difficult when it comes to co-evolution, I recognise that in all the design products I've done and I've studied as well is that co-evolution makes planning so difficult because we tend to plan a project as well. First, we do our problem exploration and then we create a problem definition and then we start doing a brainstorm and generating ideas and then we compare whatever we've designed to our problem definition. How do we work with [co-evolution] as designers?

**Kees Dorst:** The problem that design has is that it has to try and fit somehow within a world that thinks in a very linear way. About problem-solving about what projects are. What design actually brings is this kind of non-linearity. It's these learning processes, it's this co-evolution bit. So that's one of the reasons that often design departments in big firms or within R&D departments are very closed off. So you can't enter. Officially that is because we have to protect the intellectual property and all the great ideas that are developed there. In reality it's also to protect those

designers from interference by people from the organization itself. Because if people come in, in a phase where you are still working with your propositions, going 'if this...' it will look very strange to them. Why don't you guys solve this problem? Well, we're actually in a design process which is completely different. So there's a lot of misunderstanding around design. And that's where design tends to shut itself off a little bit or organize workshops. It's very hard for design to work out there in the world. Sometimes it needs to be a little bit of a bubble.

There's a great example, years ago, there was actually the design of the new Dutch passport. Designers were working on this and they're trying to find new technologies that would make it harder to fake passports. They were basically just going around with some technical experiments and graphic experiments to make it really hard to fake. The problem was that it took them a while to get somewhere and then one of the testing institutes leaked that the tests had failed, of the new passport. Well, that was actually one of, I don't know how many tests that they were doing to get to a good solution. That became questions in Parliament and the minister had to show up in Parliament and defend why the project for the new passport was taking so long. And it basically wiped out all of the design freedom for the designers so they basically had to go with the thing they had then, which was still in development, and start just producing that because it was not acceptable to keep experimenting. And that was not a very good design for the new passport. So then the whole project has failed and you think, that's what happens with these kind of things.

Also I was a designer at Volvo before, and in Volvo they realised that ok, you've got the design department, which makes all these wonderful sketches and stuff, and then you've got the production, which is the big machine. And whatever the design department comes up with, the people in production always start redesigning that a little bit to make it easier to produce, which upsets the designers because they see the quality of their design go down, or what they see as the quality of their designs and the production people go 'well, we can't help it, we need to make this them thing and what you've sketched for us is just not going to work'. So the idea was that, OK, let's avoid that, because that's a big interface, there's a lot of time that's being lost in that space. Maybe you do lose design quality in that space. So let's try and repair that by having people from production also involved in the early design phases, because they've got all of this knowledge about what works and what doesn't work in production and they can then inject that into these early design

phases. That didn't quite work because in these early design phases you're going 'oh it could be like this, could be like that, there are several possibilities and maybe this is cool'. The people from production were basically just sitting there with their arms crossed going: 'what should I make?' They weren't interested in exploring things or in several solutions or whatever. They were just what do I need to make? Tell me what I need to make and I can tell you whether it's good or not. So that's a huge cultural difference, and that's within the same firm, people that have sort of collaborated for a long time, but they're still there in completely different cultures.

So the idea of having a design space or giving design space to play around with it - 'could be like this, could be like that' - is quite important. Some firms are very good in creating the design space. Other firms are really, really bad at it. And that means that whatever you can do as a designer is very, very limited. You don't have much freedom then.

**Mieke van der Bijl:** What you're explaining is that the way that designers work through this co-evolution of problem and solution, this kind of learning process, is quite different from how people in other professions work and that sometimes clashes. And in your work, also in my work, when we apply design in kind of the social field and also working with public sector and social sector organizations, governments, who also tend to work in those linear ways, how do we deal with that? Is this creation of design space the best strategy to deal with that?

**Kees Dorst:** On the one hand, yes. On the other hand, no. When you create a bubble where design sits, you also create an interface. And that interface can be so hard to get through, that whatever you create in your bubble is just not going to happen. So the more transparent you can be, the better it is. What I often find is what I try to do with people from non-design disciplines that are going to be taking the ideas forward, or that we're going to be working with later on. I invite them into these design processes, but we have this rule here which is basically 'hats off'. So you're not there as the representative for marketing, you're just here as somebody with ideas. Because designing, framing, co-evolution, it's not strange. It's just that in a lot of professions, people get scared of it and they've organized it out, and they pretend to be much more linear and much more rational than they actually are. So creating a space which has a good design culture in a way that is approachable for other people is really the way to go, because you do need them to be involved. You also need their expertise. I mean, in that sense Volvo was right in trying to get those

people involved. It's just get them in as they are, that doesn't work. So you have to explain to them very carefully what you do. I mean, a lot of what designers do in practice is about teaching people things. It's about explaining things. It's about explaining about different ways of looking. So make it as transparent as you can, because that's where you're not going to create that awful interface that you otherwise have to get around.

**Mieke van der Bijl:** Yes that's very clear.

**Kees Dorst:** Which means that design problems become more complex. And the question is, does the traditional design way of working actually work for these very complex problems? And I think that's a real thing we have to ask ourselves. Because you see that often very complex problems are now given to the engineers and they solve it in a technical way. But I think all these complex problems also have a human side. So you'd wish for design to be able to engage with them. But there seems to be a bit of a ceiling in our way of working about a complexity that we can actually deal with, that can actually achieve.

On the other hand, if you look at some of the biggest creative processes that are happening at the moment, they're in animation. If you look at making a feature length animated film, that's thousands of people in a creative process. And they've done a really, really good job in organizing creativity on that scale. It's even bigger than what I've seen in Volvo in the car industry. But then we haven't even looked at that because we've always said, 'well, animation that's a bit of entertainment...' but there's technology development in there. There is so much that is happening. And it turns out they have a very layered way of working. So they've got different layers of architecture, because the last thing you want is somebody to just sit behind a screen and start clicking and making a funny figure or something. That doesn't work. So that's very, very sophisticated, things that have already been developed up in practice that we just don't know about.

Another thing that I find comes mostly from interviewing architects is that these famous architects, owners of these famous big architecture firms - Norman Foster, Santiago Calatrava, Frank Gehry, those kind of people. They have a very interesting role in those firms that we haven't quite understood yet, because the last thing that they should do is get directly involved in projects. When the big boss says something, everybody else stops thinking, that's not a good plan. So they need to

empower their people to do the kind of projects that fit within what the firm is doing. And it's not management, as you would learn, an MBA. It is actually about the content. But they're kind of curators of knowledge in the firm and it turns out that they've got really interesting practices to make that happen. They go across many different things. They go up to, let's say, what kind of pictures do you have on the wall in your design firm? Well, those are basically the projects that you still want to think about because they signify something very important but they're also challenging. Why do you do exhibitions? Why do you do competitions? That's because that gives you a certain freedom to actually think more broadly than you could normally do within your projects. And they're very much made for the people of the firm themselves to keep challenging yourself, to keep developing new ways of working, new ways of thinking.

That's a whole different level of designing. To me, those people are still designing. It's just they're designing the environment in which their type of design can happen. And often what you see in design schools, the first thing you tell students is design happens in projects, and projects go from a brief to a solution. Well there are layers to that, there are other layers of designing that sit around that. If you look at design firms that I know in Holland than in other places, there are some firms that are quite weak because they are just projects, people running from project to project, and making money and having fun, et cetera, et cetera. But it doesn't seem to be a build up of knowledge on top of that. There doesn't seem to be a sophistication in the way of working, etc. So they just keep doing what they do within their projects. They miss what to me is a whole other level of design that is also very, very important. And that in the end gives a firm its profile, it gives its longevity and its also an intellectually interesting thing.

**Mieke van der Bijl:** Well, still a lot of work to do for us!

**Kees Dorst:** Yes.

**Mieke van der Bijl:** Thank you so much Kees, that was very informative, thank you.

**Kees Dorst:** Ok, you're welcome!

## **DISCUSSION**

**Mieke van der Bijl:** Ok, so that was the part of the interview that I did with Kees, which was on co-evolution of problem and solution. I think this is a really, really interesting and important topic for designers to understand. In fact, I think it's so important that I developed a course a couple of years ago on design for public servants, and one of the subjects in the course I ended up calling co-evolution of problem and solution.

**Peter Lloyd:** Ha ha

**Mieke van der Bijl:** Which the public servants found a little bit difficult to understand, but one of the things that I find really interesting about this theory is that when we talk about experiments in design and prototypes, we often tend to think of these prototypes as just testing a certain solution so we can improve that solution. Whilst if we use this theory of co-evolution of problem and solution, we see that actually this experiment or this prototype is not so much about the solution, but really about the connected problem, or the way we frame the problem, so often through these experiments we learn a lot about a problem, not just about the solution.

**Peter Lloyd:** Yes, in the interview Kees says 'design is propositional' and I think what he means by that is what designers are very good at is exploring problems through suggesting solutions. You suggest a solution in order to find out what you think the problem is. That's a very distinctive way of working and that doesn't fit easily with other people's ways of working, particularly what he described as linear ways of working, in organizations to, because an organization likes to know when things are going to happen, they want to know what the process is. That's what design thinking brings, the connection between a solution and a problem. A lot of people in other disciplines think that there are problems that need solutions. There's a phrase which is an engineer comes to a designer and says, 'we can build any car that you want, but we don't know which car to build'. And that's what the designer brings is that idea that you can work on a problem, but in a kind of solution focused way. The other thing I quite liked in in Kees' interview was this idea of what value designers bring. It's sort of clear that other people think they bring this value, but they don't really understand HOW they get that value, or in how to invest in that value or even, you know, where to put the designers. So there there's an element of, you know, if an organization values design, it has to protect the designers, and that

creating that space or that bubble that Kees said that's a real challenge. To actually account for what designing is to other people.

**Mieke van der Bijl:** I mean it's quite paradoxical because, on the one hand, we're saying like 'oh, nobody understands us' and then on the other hand, we're saying, 'well, you know, we need to be protected'. Just put us in this, what Kees calls a design space. But then we're essentially creating a bubble that only creates more distance between designers and other professions. The question is do we really need a separate space? Because then the framing is almost like, okay, we have to teach people - that's literally what Kees is saying - we have to teach people what design is. But I think it's also a bit problematic because we're just thinking about 'no one understands us, we just have to teach others'. We're not really thinking about others at all. We should also maybe ask engineers, or any other kind of professional we're working with, how do YOU work? How is what you are doing different from what we are doing? and what would you like to learn from us? So create more of a conversation rather than saying 'I just need to teach you how I am thinking'.

**Peter Lloyd:** When you think about acquiring experience or what expertise brings is that you just have a natural repertoire of solutions to draw on and you begin to recognize certain types of problem. It's not just designers that do this, but as people get more experience in their day-to-day life, or whatever professions that they choose, they begin to recognize OK this is a particular problem-solution. Maybe this is the right solution to go with, so as you acquire experience, you naturally become a bit more solution-focused. There is a very famous study by someone called Jane Darke who wrote this paper called 'The Primary Generator' and she did a study of five or ten architects, experienced architects, and she took them to an architectural site and got them to talk about how they would tackle the problem. She said very quickly, they say 'OK the light is over here, the elevation is over here', they quickly map the problem landscape and then they come up with a solution. You know, we should put this over here and that over here, and that forms the basis of their solution so they're very quickly thinking of a solution in order to tackle the problem and take it further.

**Mieke van der Bijl:** I'd like to add to that, because I know Jane Darke's paper and the idea of the primary generator. Indeed, that's one of the drivers this kind of expertise like designers they use these primary generators, some people call it principles, based on all the projects they've done before, they have this expertise.

But they also found that they use research. In those studies people don't talk about all the research that designers nowadays do, they really do go out and explore and use their ethnography or context mapping of whatever techniques they use. They use solution-driven design, so the provocative prototype. Some of them use what I call reflection tools in their design process, all kinds of maps that they use in their process. So there are kind of different ways in a design process, different types of inputs that designers can use in that problem-framing process. I think that expertise and the use of solutions are really quite key things and quite different from what other people might use in their practice.

**Peter Lloyd:** I think that the interview covered a lot of things that will be familiar to a lot of people struggling with problems and thinking about solutions and how they fit one another. As with the first podcast, and as with the podcasts to come, we write some show notes which give you all the references, the things that we talk about that we think might be of further interest to you. So go and have a look if you want to follow up any of the ideas that we've been talking about. Have a look at the show notes. Ok that's it for the second podcast, thanks very much, Mieke.

**Mieke van der Bijl:** Thanks Peter, very interesting!