Now let's move to talking about complex systems. The first is: what is a system? We use the word very lightly. but not all systems are complex systems. But all systems have these elements: it's a whole of interrelating, interdependent parts and you can't understand it as a function of any isolated component.

Unlike Newtonian theory which says you just take the parts of a clock apart and you understand the clock, in a complex system, if you take the parts—if you remove the parts from the system—they make no sense at all, because they only work in context with the other parts.

Behaviour does not depend on what each part is doing, but how each part is interacting with the rest. Every system is a subsystem of a larger system. When we talk about a complex system, we're making a choice of bounding it in a certain way and it's an artificial choice. There is no way to bound a complex system. It always has feed-ins and connections to others; but intellectually and in terms of action, it's very hard for us to deal with an unbounded system, so we do create boundaries around the system.

And it's not obvious, meaning, what we call the parts and their relationship is fundamentally a matter of that perspective and purpose. It's not something embedded in the system, itself. It's something we bring to the system?

This brings us to another important insight about systems: there is no subject/object in complexity theory, meaning that you're not the observer looking at something that exists apart from you and studying it. That is part of a Newtonian view of the world but not a complexity view.

In a complexity perspective, you are always part of the system that you're looking at and you have an effect on that system. It would not be the same system without you, so there is no objective *system* that exists outside of you. And that has very practical and important implications for what it means to interact with those systems.

You're part of the system and what you choose to call a system is the piece of it that you have chosen to look at and that you have set boundaries around for whatever purpose you have. Sometimes it's conscious; sometimes it's unconscious. It's just what you attend to because of the strength of your

interests and who you are; but it's very particular to you. You bring any system that you're looking at into being. It wouldn't be there without *you* looking at it and you deciding to bound it in that way. Now, there could be a number of people who agree with bounding a system in a certain way, but they are all part of it in that act of doing that. That is a very important aspect of system thinking.

In terms of action, one of the things that I like to use as an analogy. It's an analogy used by a man who first started talking about mega-systems and mega-messes and all the interrelationships of complexity, a man named Eric Trist who was at the Tavistock Institute in London and has written a whole series of books and articles about this that you might be interested in reading or pursuing.

The analogy he liked to use goes back to our original picture of the storm at sea. He said, let's start with imagining that you are on a sailboat and your job is to sail that boat back to a particular port. Sailing requires a fair amount of expertise and skill if you're out in the ocean. You have to learn how to tack, know the directions to the wind, how to manipulate the wind to make you go where

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you want to go, and you have to contend with the movement of the water and usually working with a crew, so there's usually a number of you working together.

Now let's imagine that a storm blows up and, unbeknownst to you, you're not alone. There's a whole fleet of boats in the storm that are connected under the waves by flexible iron poles. They're chords; they're very flexible; they move. There's some slack in the system, but meanwhile, you're trying to get home safely to your port, and all those other boats are trying to get out of the storm but they're trying to go to different ports. What happens?

On an experiential level, what happens? Well, when you act to go in the right direction, dealing with the waves and the wind which are all enough of a problem, you suddenly, unexpectedly, find yourself yanked off course. You don't know why, so you correct again to try to get there, and you're yanked off course again—this time by some pressure from an opposite direction. You don't know what's going on.

Eric Trist argues, well, how is that system ever going to be able to get back to shore safely? His argument is there's no hope

unless everybody realizes they're connected, unless all the boats do realize that they're connected together and that they exist, and they pretty much have to decide where they're going. Somebody is going to—or all of them together are going to—have to pick a direction; because otherwise none of them will get back.

He uses this analogy to talk about the fact that actors in complex systems really can't control what's happening to them. Going to an education analogy, what am I going to do with my career? Many people—and we all know this and it's one of the crises confronting the educational system—is that you may do all the right things, take all the right courses, get all the right credentials, and there's no job. Because the economy has shifted out from under you; and what you were trained to do does not seem to be able to take you to a job, and then you're in a highly complex situation because, in fact, you, just on your own, have no control over that.

You can think you're doing all the right things to get to that safe harbour, and yet you're being pulled of course all the time by things that you hadn't expected, you weren't

looking for, and you're struggling to find. It's a complex problem and it requires a solution at the level of the system.

Nobody, no individual acting alone is going to be able to figure it out but at the level of the whole system, the educational system, there's no way that even the educational system can sort this without working much more closely with other kinds of systems in the world: the corporations, the employers, the NGOs, the communities, the families. We have to agree what we want to see different and we have to create some certainty about how to get there and we don't really know what that is.

There are many, many voices all trying to move in different directions around it and you, as the individual trying to steer your boat, are likely to be buffeted by those things. That becomes quite complex and very hard to manage.

That's the other thing. Something that may seem complicated at one stage suddenly becomes complex as circumstances change. That system is always connected with other aspects.