

Most Important Classic HF/E Concept

Peter Hancock - The most important classical concept that one can have, I think, again trying to paint the big picture, the most important classical concept is that things should be human centered. What you have to understand is that for a large percentage of our recorded history human beings were largely seen by those people with the power and the power differential as a fairly interesting form of dross, all of you know of course about your classics and Aristotle's view and Plato's view on slavery, but the idea itself that things should be human centered and human centered for each person is a very powerful concept and the percolation of that concept, not the origin of it, but the percolation of that concept into a reasonably prominent place has taken a long time to do and it's hard for us because human life is as short as an individual. To understand that that is a great step and I think that's the most important concept. There is a human centered approach. In terms of recent developments I will just name two, one is that um, is the idea of neuroergonomics that our colleague Raja Parasuraman has put together. I hasten to add it's another occasion in which um, there are many people working on mind machine melding together, they are in the medical area, they are in the cognitive science, they are in neuroscience, they might not have even heard of human factors, but I think Raja's perfectly correct the extensive outreach into the face of technology is absolutely critical and I applaud him for that and I'm very, very interested personally in this new idea of resilience and adaptation, I've been interested in stress and adaptation for a long time and I very much want to support something that Professor Sheridan and I have tried to talk about and encourage people to maybe explore more deeply which is um, the foundations of the idea of what is an error and can we use then the idea of adaptation and resilience to overcome the purgative nature of human error as it's presented to the lay public.

Dick Pew – the classic concept that I want to promote in this context is the notion that predicting behavior outcomes depends on the context in which they take place and that no two contexts are exactly alike. This is almost a truism that we think about all the time, but I really think it is one of the most profound things we have to think about when we're thinking about, ah, trying to understand human behavior. When we generalize, we're making a statement that we can create a category of contexts and that the outcomes will be substantially similar within that category. Otherwise we don't have any, we, we can't use the kind of predicting prediction that Peter was talking about. Human performance models are most successful when the context, that is the stimulating conditions are fully specified, as in manual control models where you know exactly what the environments telling you to do. The difficulty and the paradox, this is also my reference for paradox is that, when we're predicting what will be successful in human system design is that the context will never be fully defined until the system design is complete. So, how can we predict when we don't know fully what the specifications are for the context in which it's going to take place. This is what leads us to the concept of the iterative design.

Christopher Nemeth – thank you, Tom

Dick Pew – I don't have a reference for that insight.

Tom Sheridan – I will be rather short, having been brain washed in my education in control theory, um, for, we were limited to a single concept, I chose feedback. Ah, feedback shows up in you know, operations, training, everything and ah, it seems to me

whether it's ah, sensory, motor, cognitive, whatever kind of behavior there's feedback that drives what happens.

Christopher Nemeth – Thank you. David Woods had more than a few thoughts to share; I will do my best represent what he had to say. So the most important classic concepts or good ideas that everyone knows but..., study how people adapt to cope with complexity and he uses Rasmussen and Linde's 1981 paper as a reference. If people are in the system and all system boundaries eventually have to be redrawn to include people in some roles with something at stake that it's all about adaptation to disruption and change. Given this then, technology change is an example of these adaptive processes, see Winograd and Flores, 1986. Take heed of Norbert Wiener's warnings on danger of literal minded agents, especially machines. Read his version of the *Monkey's Paw*. Take heed of Allen Newell's warning that you can't play 20 questions with nature and win. Read Newell's version of the *Lady and the Tiger* for the role of responsibility in cognition. Feedback is essential for control, but feedback is the "property of being able to adjust future conduct by past performance," from Wiener's 1964 work. Thus expertise is tuned to the future even though data is about the past. The mystery is how anticipation can be the hallmark of expertise when predictive models are too cumbersome and brittle to rely on given the potential for surprise. And with regard toward expectations, people's behavior depends not on what did happen, but on what could have happened and especially what could happen next. More comments please. Anybody from the audience care to add their own thoughts about the most important classic concept in human factors. Yes sir.

Audience member – I'd like to comment on...

Christopher Nemeth – your name and organization please

Audience member – Roy Kelly - Army Research lab – I'd like to comment on what Dick had to say, because he was suggesting we can never predict behavior because the context that the behavior occurs is constantly different. So that, that's kind of bad news for me, I'd like to think that I could potentially some day or even now predict, predict peoples behavior given certain concepts. So, so did I hear you correctly or, or...

Dick Pew – What you're doing, what you're doing is you're creating a class of context and you're saying these contexts, this class, I can predict it in this class, but each one is unique and you're, you're lucky if it happens to fall within that class. Also, if you're talking about design, then the design of an interface is, ah, probably the most important element of the context. So to predict behavior in a, for a particular system, before you have a full definition of the context defined by the interface is very difficult, if not impossible.