URL: https://stvp.stanford.edu/clips/thinking-without-thinking

Barbara Liskov, Institute Professor at MIT, describes how taking regular breaks from intensive work can create the mental space that allows great ideas to emerge. Finding the right balance between focused daytime research and restful evenings, she observes, has helped her untangle complicated problems, and once contributed to a crucial insight about "abstract data types."

Transcript

- And the way I have always done my research is to focus very hard during the day, and then I stop working.. I go home in the evening and I don't work.. Okay, but the thought I was doing during the day, it's in my subconscious.. And so I'm still thinking about things even if I'm not thinking about them.. And a common situation for me would be that when I'm driving into work in the morning and I'm kind of thinking about, "What am I gonna do today?" All of a sudden I see a solution to a problem I hadn't been able to solve the night before, the day before.. So the subconscious, the power of the subconscious and also making sure you're not too tired is a very effective way of doing your work.. So I'm thinking about this question, about how to do modularity, and all of a sudden I had this insight.. I thought of data abstraction.. So before I had talked about these modules with multiple operations, but they were disconnected from any notion that might make sense for design.. And when I saw that this could be connected to the notion of an abstract data type, that made a huge difference because people already understood about procedures as a way of breaking things into modules..

Those were abstract things, like a sort routine, which is sort of independent in how you implement it, but it's an abstract idea.. Same idea here.. I could have a set.. I could have a stack.. I could have a tree.. Whatever it is, I could think about that as an abstract concept.. I could invent it during design, and then later I could figure out how to implement it.. So it gave me a way not only to break things up into much bigger, more effective modules than what we had before, but it also connected to a design process where I could think about things abstractly, and then focus on how to implement them is the second step.. (coughing) So that was this wonderful idea I had in 1972, sometime or 1973, (coughing) which was the invention of the abstract data type...