

With this bi-directional interface, users manipulate physical cubes to construct and interact with 3D virtual objects. All the faces of the cubes are the same and can be connected to any face of any other cube. The computer recognizes the constructed 3D structure in real time, so consistency is always maintained between reality and its corresponding representation in a virtual environment.

Each cube is equipped with a processor for autonomous simulation and communication functions between cubes. The cubes also has a sensor to detect the operational intention of the user and/or a display-actuator output channel. As users interact with ActiveCube in various ways, the displays-actuators present responses. This combination of input and output devices makes the interface intuitive and helps to clarify the causal relationship between the input of the user's operational intention and the output of simulated results.



*Children playing with the ActiveCube.*

*Collaborators*  
**Yuichi Itoh**  
**Michihiro Kawai**  
**Masatsugu Asai**  
**Toshihiro Masaki**  
**Fumio Kishino**  
Osaka University

**Hideo Kikuchi**  
System Watt Co., Ltd.