3D or Not 3D: When and Why Does it Work?

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Wishful thinking about the widespread adoption of three-dimensional interfaces has not helped spawn winning applications. Success stories with three-dimensional games do not translate into broad acceptance of head-tracking immersive virtual reality. To accelerate adoption of advanced interfaces, designers must understand their appeal and performance benefits as well as honestly identify their deficits. We need to separate out the features that make 3D useful and understand how they help overcome the challenges of dis-orientation during navigation and distraction from occlusion. Does spatial memory improve with 3D layouts? Is it true that 3D is more natural and easier to learn? Careful empirical studies clarify why modest aspects of 3D, such as shading for buttons and overlapping of windows are helpful, but 3D bar charts and directory structures are not. 3D sometimes pays off for medical imagery, chemical molecules, and architecture, but has yet to prove beneficial for performance measures in shopping or operating systems. This talk offers a taxonomy of 3D features and applications, and advocates systematic empirical studies.

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Ben is the author of Software Psychology: Human Factors in Computer and Information Systems (1980) and Designing the User Interface: Strategies for Effective Human-Computer Interaction (3rd ed. 1998) http://www.awl.com/DTUI/ . He pioneered the highlighted textual link in 1983, and it became part of Hyperties, a precursor to the web. His move into information visualization helped spawn the successful company Spotfire http://www.spotfire.com/ . He is an advisor for http://www.smartmoney.com/ where his treemap visualization is used for stock market data, and for http://www.Clockwise3D.com which has developed a 3D front end for Windows. With S. Card and J. Mackinlay, he co-authored Readings in Information Visualization: Using Vision to Think (1999). Leonardo's Laptop (MIT Press) will appear in Summer 2002.