Technology innovation has led to the emergence of Post-WIMP interfaces and technologies, which take advantage of new ways for an individual to interact with people, technology, and their environment. These include tangible computing, virtual and augmented reality, and ubiquitous computing, lightweight, tacit, or passive interaction, perceptual interfaces, affective computing, context-aware interfaces and multi-modal interfaces. Reality-Based Interaction (RBI) groups those interaction styles that allow the manipulation of interface elements through actions that either are taken directly from the real world, or that are based on familiar concepts taken from the real world.

RBI proposes that the new interaction styles share underlying interaction principles that leverage and take advantage of human knowledge, based on observation and interaction with the outside world. It is a framework to identify the common principles, and a first step towards making reliable comparisons between the new methods of interaction. This does not suggest that all the interactions between the user and the computer must be similar to interactions with the real world. This would be very limiting on what one could do, especially when through the use of a computer, a user may perform actions that would never be possible in a real world setting, such as flying, or having X-ray vision. Thus, the real world is only used for grounding the interactions that occur on familiar concepts, but wherever possible the action used in the real world is also used in the interface. Nonetheless, as we could claim that the mouse and keyboard are today as much a part of the real world as anything else, RBI limits the use of "real world" to aspects of the physical, non-digital world. "In particular, the framework focuses specifically on four themes from the real world:

• Naïve Physics: People have common sense knowledge about the physical world.

• Body Awareness & Skills: People have an awareness of their own physical bodies and possess skills for controlling and coordinating their bodies.

• Environment Awareness & Skills: People have a sense of their surroundings and possess skills for negotiating, manipulating, and navigating within their environment.

• Social Awareness & Skills: People are generally aware of others in their environment and have skills for interacting with them (Jacob et al., 2008).

For example, tangible computing is intuitive by conforming to common sense knowledge about the physical world; in virtual reality (VR) environments, interaction can be natural when it is designed to meet expectations, for interaction with technology and virtual agents; and for augmented reality, interactions with the environment may be designed to overcome ordinarily difficult manual or cognitive tasks, to make reality more intuitive. Also, interactions that would never occur in the real

world, such as giving the user the ability to fly in a VR environment, can be based on a familiar concept, such as that of superman, holding one hand clenched in a fist raised upwards and leaning to the front a bit, to simulate the action of flying.

The evaluation of interfaces built using RBIs creates a unique set of problems that are rarely examined in mainstream usability research, such as the evaluation of continuous actions other than pointing, parallel actions, and the completion-time evaluation of body movements, again, other than pointing. Whilst RBI seeks to categorize and explain why and how these new interaction styles are similar, there has not been an effort to establish evaluation methods that will provide comparative metrics, design and evaluation principles, for and across interaction styles. In fact, researchers create their own evaluation methods and metrics when they create a new interactive system to evaluate its interactive performance, due to the lack of agreed evaluation methods across new interaction styles. However, this leads to several questions about the reliability, reproducibility and validity of the obtained results for a particular interaction, and no means to compare interaction across styles. Also, researchers have only sought to establish design and evaluation principles for a particular interaction style, leaving the challenging design decision regarding what is the most appropriate interaction style for a particular interaction. Again, this is because researchers, who are focused on a particular interaction style, may not be as familiar with solutions that emerge from work in other interaction styles.

Our goal of this Special Issue is to present different approaches to the evaluation of Reality-Based Interfaces (RBI), and highlight the challenges inherent in their application and comparison across interaction styles. Each of the three articles included here presents a different evaluation method on a different interaction modality. Stedmon, Patel, Sharples and Wilson present a study that investigates and evaluates speech input for Virtual Reality applications. Reilly discusses the impact of several factors, both human and technical, on pointing to physical objects in a room with a handheld pointer. And Paulson, Cummings and Hammond examine whether hand postures may be used as cues to determine the kinds of interactions a user has in a desk/office environment. All three studies provide interesting ways of looking at RBI evaluation, and describe several challenges that need to be overcome to successfully evaluate interactive tasks in RBI environments. The common rationale underlying all three studies is how to design and evaluate these different interaction tasks so that the developed interactions can be easier and more natural, exactly the theme that is promoted by RBI.

References:

Jacob et al., 2008 Jacob, R.J.K., Girouard, A., Hirshfield, L.M., Horn, M.S., Shaer, O., Solovey, E.T., Zigelbaum, J., 2008. Reality-Based Interaction: A Framework for Post-WIMP Interfaces, CHI 08 Conference on Human Factors in Computing Systems, Florence, Italy, pp. 201–210.