1. The AR display could include a virtual thermostat for each room, which the user can interact with. It could also display the temperature of each room in the home.
2. Both systems would likely use the metaphor of “up” for hot and “down” for cold. However, the hololens might also use the metaphor of a physical thermostat (i.e., making the virtual thermostat look realistic) to make use of the existing mental model their users likely have of what the interface will do and how to use it.
3. The interface might make use of regions to position the controls for each individual room’s temperature in accordance with the room’s approximate geographic location. For example, the controls could be arranged into rows where each row represents a floor of the building.

Efficiency might also be improved by employing marks such as colour – perhaps colouring the colder rooms blue and the hotter rooms red. That way the user would be able to tell at a glance whether the building’s temperature is overall roughly what they expect it to be. Furthermore, this would allow the user to quickly spot significant errors (e.g., if a room is far too hot, its area will appear much redder than it should).

In a multi-storey building it is quite likely that all of the rooms have names, so it might aid efficiency to use symbols such as labels such that each room’s individual temperature controls would appear next to the room’s name. This, along with the positioning of the rooms’ controls themselves will help the user find the controls for the room they are looking for much faster.

1. Diffuseness is relevant to this task, because the interface can allow the user to perform the task they want via very few actions (perhaps one or two button presses). However, if this system was controlled via speech, the user would have to use natural language to convey the room whose temperature they want to control. Depending on the building, this might require very verbose language (e.g., “Room 3 on the 2nd floor”).

Indeed, since natural language processing can be unreliable, the user would likely worry about the precise way in which they phrase their command so as to be understood. This speaks to the voice-controlled system’s secondary notation. For the visual system, there is no room for secondary notation as the set of possible interactions is small and evident.

Visibility is also very relevant. The visual system allows the user to quickly see the status of every room. However, a speech-based system would likely either force the user to ask for the temperature of each room individually, or else keep in mind a long list of temperatures told to them at once. Hearing a number spoken out loud requires more mental effort to interpret than a spread of colours.

1. Different group of users could be observed trying to perform operations using different interfaces, and a correspondence could be inferred based on which designs allow the users to map their intentions to actions most efficiently.