Nimbus & Focus: The Impact of Architectural Design on Public Displays

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Abstract
The architectural environment of public displays has a huge influence on their usage. In this position paper we present a design space based on two complementary concepts, *Nimbus* and *Focus*, to describe and compare public display configurations. Focus describes what one can see, and nimbus from where one can be seen. We performed a field study comparing three differently shaped public displays: *Flat*, *Concave,* and *Hexagonal*. Results show that *Flat* triggers the strongest honeypot effect, *Hexagonal* causes low social learning, and *Concave* triggers the smallest amount of simultaneously interacting users.

Author Keywords
Public displays, Form factor, Chained displays, Field study.

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction
The architectural setting of public displays in their environment has enormous impact on their use. Dalton et al [3] used space syntax to describe from where a

certain displays can be seen. We extend this approach by a concept from virtual environments: Focus and Nimbus. Focus describes what a person can see, an Nimbus describes from where a person can be seen.

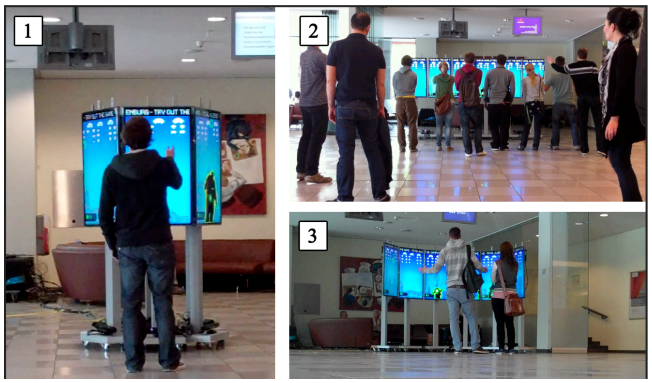

Figure 1. Chained Displays: (1) Hexagonal: actors can limitedly see other screens resulting in low social learning (2) Flat attracts more people (Honeypot) because actions and their effects can be observed (3) Concave: actors have a limited interaction space resulting in few simultaneously interacting users.

These concepts are somewhat complementary to the concept of Isovist used in space syntax introduced by Dalton et al. Following Reeves et al. [4], the population around a public display can be distinguished into actors, the people actually interacting with the display, and audience, the people passively observing the entire situation. In particular for actors, it is important whether they can be observed by other actors and audience (what their nimbus is) as well as whether they can observe the other actors or audience (what their focus is). Our central proposition is now that the concepts of Isovist and Focus and Nimbus can be integrated. This integration highlights another property of public displays: Their interaction area. As many interactive public displays make use of sensing technologies like computer vision, there is also an area that "can be seen" by the display: Its interaction area. We can now call the Isovist of a display its nimbus, and the interaction area its focus, leading to a symmetrical description to that of the actors.

We applied this concept of focus and nimbus to chains of smaller displays (chained displays), see Figures 1 and 2.

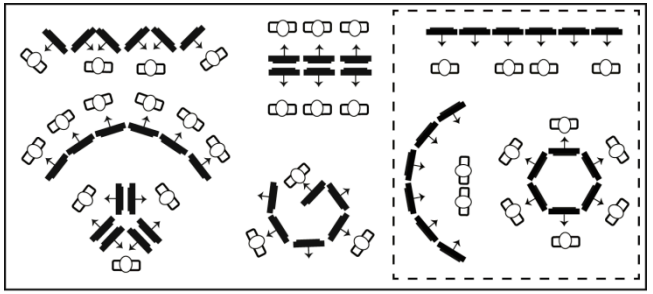

Figure 1: An overview of possible 6-chained display configurations. In dashed lines: the chained displays we tested

The Isovist (nimbus) of the displays is analyzed in Figure 3, the interaction area (focus) is analyzed in Figure 4. Nimbus and focus of actors are analyzed in figures 5 and 6, accordingly.

We deployed each of the 3 display shapes for a day in a field study (see Figure 1) and analyzed audience behavior according to nimbus and focus. The most surprising result was that for the nimbus, it was often less important whether the person herself (and her

manipulations) could be seen by others, but rather whether the representation of the person (and the effects of her manipulations) could be seen.

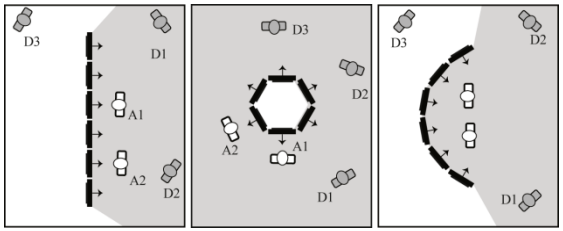

Figure 3: Public display Nimbus for each configuration: Flat, Hexagonal and Concave (in white actor, in gray audience member).

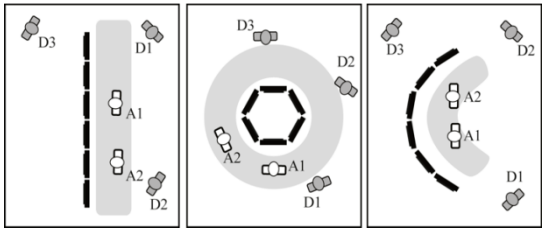

Figure 4: Focus of three chained displays configurations: Flat, Hexagonal, Concave.

For example, social learning between actors was lowest in the hexagonal display, where actors could see each other well (large actor nimbus), but not the effects of their actions to the screen (small nimbus of actor representation on screen). In contrast, the flat display had a large simultaneous visibility of the actions of multiple actors, and accordingly, the honeypot effect was strongest. The concave display had a rather small interaction space (display focus), leading to few simultaneously interacting users.

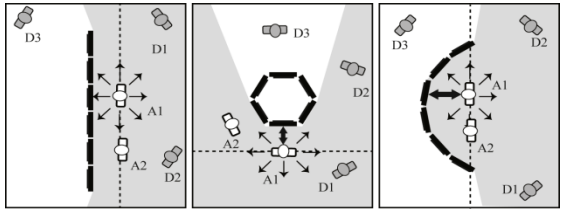

Figure 5: Actor nimbus depending on the configuration.

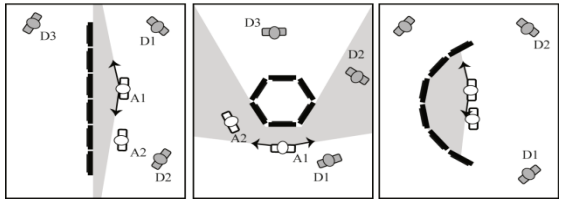

Figure 6: Actor focus for each configuration.

References

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