

# Large Touchscreens and the Average User – An Evaluation

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## 1 Introduction

As Swaminathan and Sato noticed, „when a display exceeds a certain size, it becomes qualitatively different“[SS97]: E.g., among other things, it was found that large displays improve productivity in desktop/office use (e.g. [CSR+03]) and performance on spatial tasks (e.g. [TGSP03]). When touch-input is added, these displays also help to facilitate effective collaboration [HKR+05] – a claim backed by field reports (e.g. [RTD04]). However, large touchscreens also pose specific challenges (e.g. Robertson et al. list, among others, distal access, window- and task-management [RCB+05]); touch input adds precision issues [PWS88] and complicates text entry (see e.g. [HHCC07]).

To learn about the problems users with only average IT-experience have with large touchscreens, we conducted an exploratory study with volunteers from a disaster management background (all male, no age reported) on a 3x1.5m display wall with single-touch input. The users’ self-assessed computer experience was 3 (average) on a five-point scale. None of them had prior experience with large displays and none used any touchscreen devices on a regular basis. The study included a series of five tasks (one training task) that consisted of eight different interactions with standard GUI widgets: Pressing a button in a toolbar, selecting an entry from a dropdown list – with and without scrolling, navigating a tree, picking a specific date from a calendar, positioning an object on a map, drawing an area on a map, drag and drop of an object and using an onscreen keyboard for text entry. Users were both asked to give general feedback whenever they felt and to rate the perceived ease of use in a post-task questionnaire on a seven point scale (1: “very easy”, 7: “very hard”). A post-test survey also inquired about the perceived usefulness of a large touchscreen display for their work.

## 2 Evaluation Results & Outlook

Contrary to our expectations, users had little trouble with the new device – the average rating for ease of use was ~2.1 (variance ~1.2), nearly equal to a rating of 2/easy. Further on, users commented positively that interaction with the device resembled classical map and whiteboard interaction, allowing them to keep their learned metaphors.

While generalization should be taken with care, there were indications that some interactions were more difficult for the users than others: Especially drag and drop (mean 2.67, variance 1.47), selecting an entry from a dropdown list requiring the user to scroll down (mean 3, variance 3.6) and shape drawing on a map (mean 3.33, variance 1.47) were perceived to be difficult (other means  $\leq 1.83$ , variances  $\leq 0.7$ ). Thus, these widgets should be avoided or additional interaction support should be offered.

Qualitative feedback suggested that a general improvement could be made by providing touch feedback – the nature of feedback proposed, however, was visual and not haptic. Yet, post-test comments indicated feedback may become less relevant with more training. Further on, a pattern we observed frequently across all tasks and users was the preference for physical movement instead of virtual movement of the respective window (conforming well to the observations of Ball & North [BN05]).

While all of the participants were positive about the prospective use of such a device, we found half of our users sceptical about multi user scenarios, contrary to the results of Russell [RTD04]. Further research could be helpful to investigate the potential obstacles to multi-user in more detail. As large touchscreens offer the chance for collaborative interaction, it seems necessary to gain a better understanding of the fact that half of the participants envisioned such devices to be used in single user settings only.

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