

How to lose friends & alienate people: Sharing control of a single-user system

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Home media systems (like TV set top boxes) have traditionally been designed to support one user at a time, with control shared through the token of the remote control. In an environment where our hands, voice, or phone could potentially control a media system, how should we facilitate sharing control?

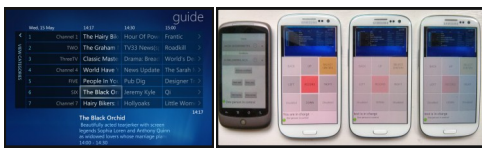
Design & Methodology

Social decision schemes for mediating control

“A group’s method for combining individual member’s inputs in a single group decision” Forsyth, “Group Dynamics”, 6th ed.

We trialled ten control schemes (see right) based on social decision schemes and existing behaviours. These schemes were used to mediate who could control an EPG system (electronic programing guide, see left), with control enacted using Android devices as basic remote controls.

For our study task we used groups of friends/family (n=3, 5 groups) scheduling recordings for assigned blocks of time using an EPG (Windows Media Centre) pseudo-randomly populated with programs sourced from British and New Zealand TV listings (to ensure an amount of unfamiliarity). Trials were conducted in a mock living-room.



One person at a time in control

- A - Remote control analogue
- B - Can lend control and take it back
- C - Control can be passed around
- D - Control can be taken off them
- E - Turns enforced periodically

Everyone in control

- F - Everyone in control simultaneously
- G - Majority rules voting for selection
- H - Hierarchical
- I - Everyone has a subset of control
- J - Can block each other temporarily



Results & Conclusions

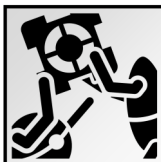
1. One person in control > Everyone in control



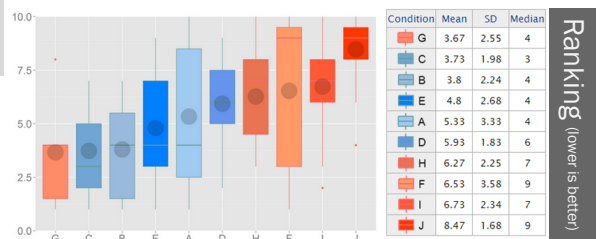
The “everyone in control” conditions were found to be statistically significantly different ($p < 0.05$) in SUS (System Usability Scale), a measure of the usability of a system in terms of effectiveness and efficiency; these conditions were markedly inferior to the “one person” conditions (see right)



2. Lending, passing, & taking control are, at worst, comparable to having one physical remote control



NASA TLX (Task Load Index, a measure of perceived workload), SUS, and dominance behaviour in terms of actions per user were comparable across the “one person at a time” conditions, whilst mean rankings (see right) were superior to the control (condition A).



3. Everyone in control is a bad idea if simultaneous use is likely

The “everyone in control” conditions exhibited worse mean user-assigned rankings, poor SUS scores, higher TLX mental demand, lower perceived performance, and higher frustration, as well as greater dominance behaviour (one individual exhibiting more control than the others). The exception to this is in enabling plurality decisions (condition G), which was well received (however qualitative feedback indicated the underlying control aspect was still disliked!).



What does this mean?

If the system/UI cannot be redesigned to accommodate multiple users, then control should be treated as something only one user can possess at a time.

Why does it matter?

Given multiple potential avenues for control, this work suggests how to share control of a system whilst retaining the “one user at a time” mental model.



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Interaction
Group

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