A Dependable User Interface for Setting XP File Permissions

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Problem

Many security vulnerabilities are caused by user interfaces that induce people to make errors. What kinds of errors do people make, what causes these errors, and what can be done to prevent them?
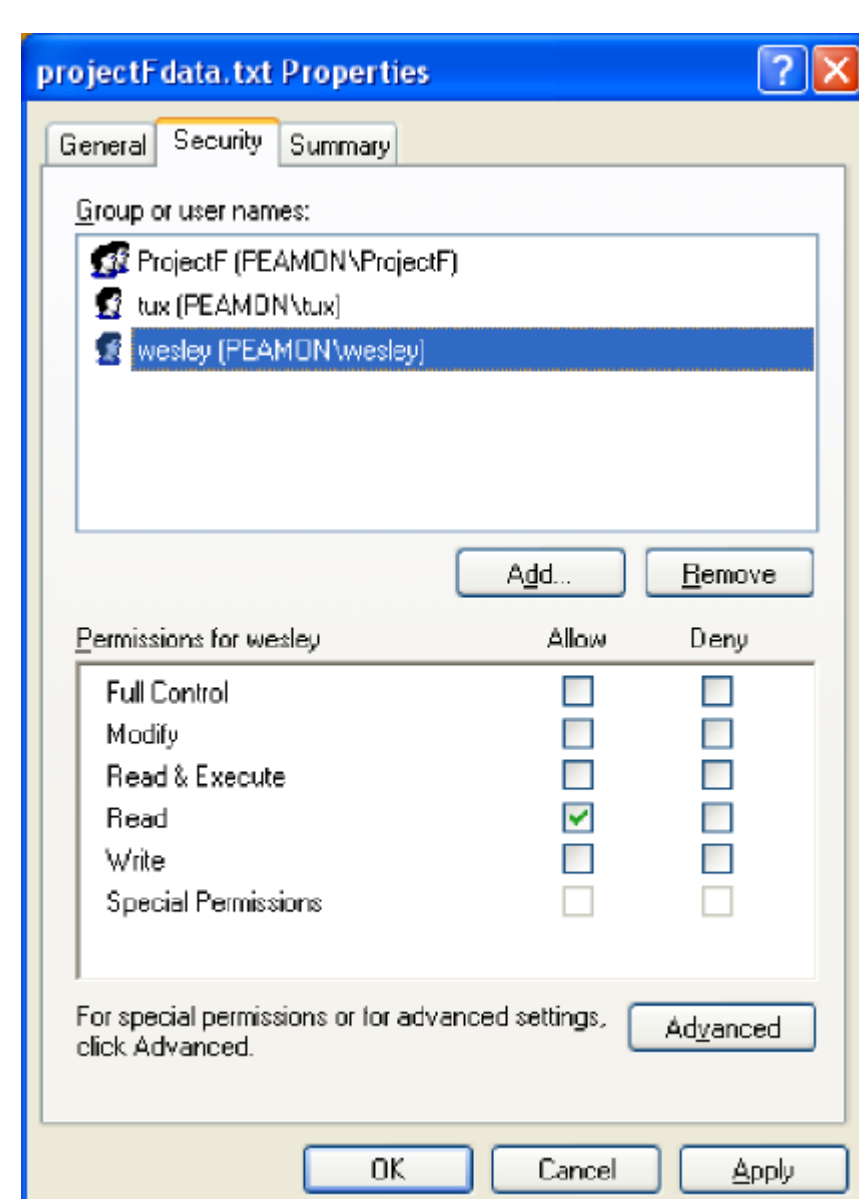
Goals

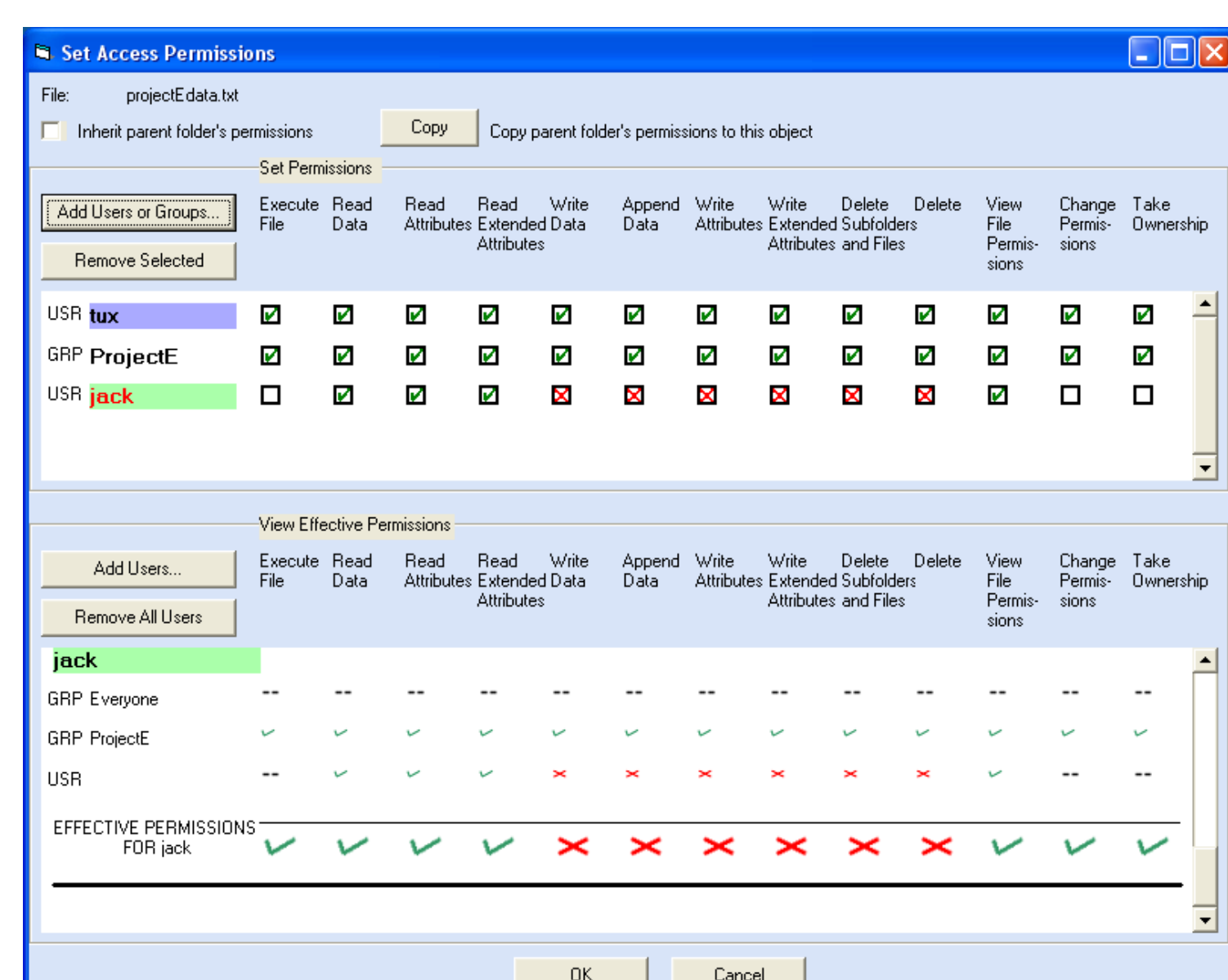Improve accuracy rates for Windows XP file-permission setting tasks.

Find a *replicable* approach for designing dependable interfaces in other security domains.

Understand *cognitive concepts* behind why the approach works.

Approach

Focus: Windows XP file-permission setting interface

1. Observe errors in the native XP file permissions interface.

2. Categorize errors – Goal, Plan, Action, or Perception. (after Pocock et al., 2001)

3. Note dominant form of error; identify its cause.

4. Propose UI design solution to eliminate error.

5. Implement design solution in a new interface

6. Evaluate performance of the new interface against the original in a controlled user study.
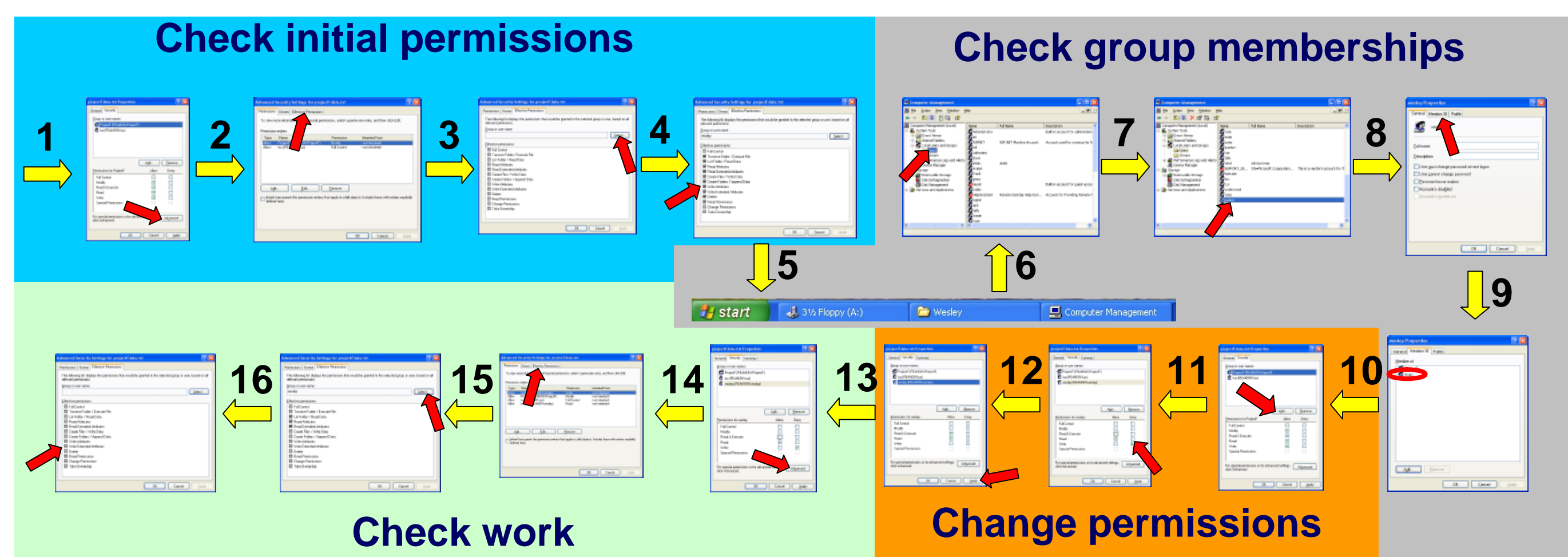
Interfaces

Windows XP – not designed with *external subgoal support*

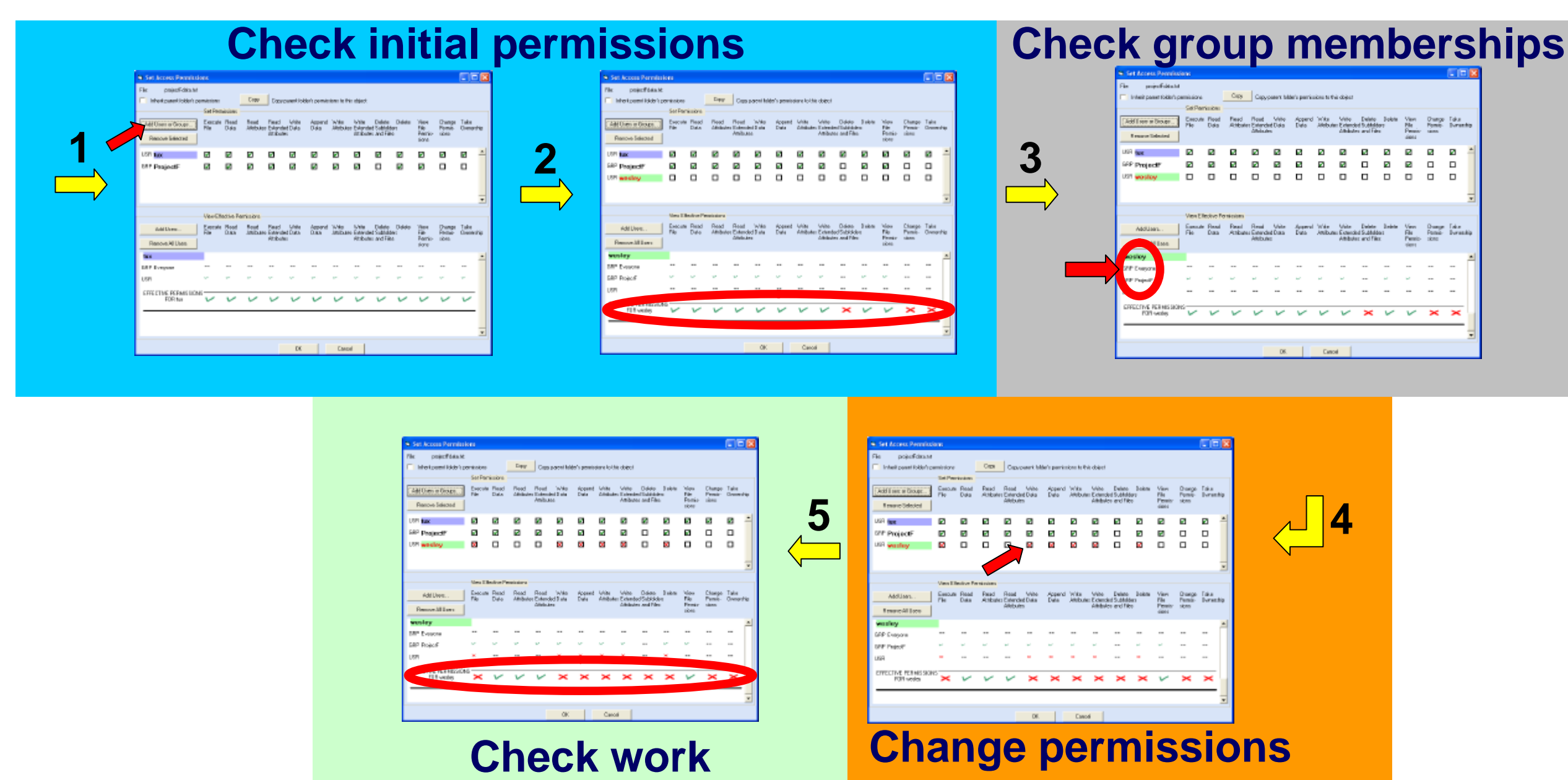Salmon – our interface, designed using *external subgoal support*

Steps to complete a typical task with XP:

Check initial permissions — Check group memberships — Check work — Change permissions

Steps to complete the same task with Salmon:

Check initial permissions — Check group memberships — Check work — Change permissions

Results

1. Goal errors, which are caused by an interface not providing users with the information necessary to know *what* to do, dominated in XP.

2. *External subgoal support (ESS)*, a procedure for designers to ensure that all necessary information is available to users, was formulated.

3. *Salmon*, an alternative to XP, was developed in accordance with the ESS procedure.

4. Salmon and XP were compared in a laboratory user study with 24 participants (12 per interface). Salmon vastly outperformed XP in accuracy and in goal errors committed, and modestly outperformed XP in speed.
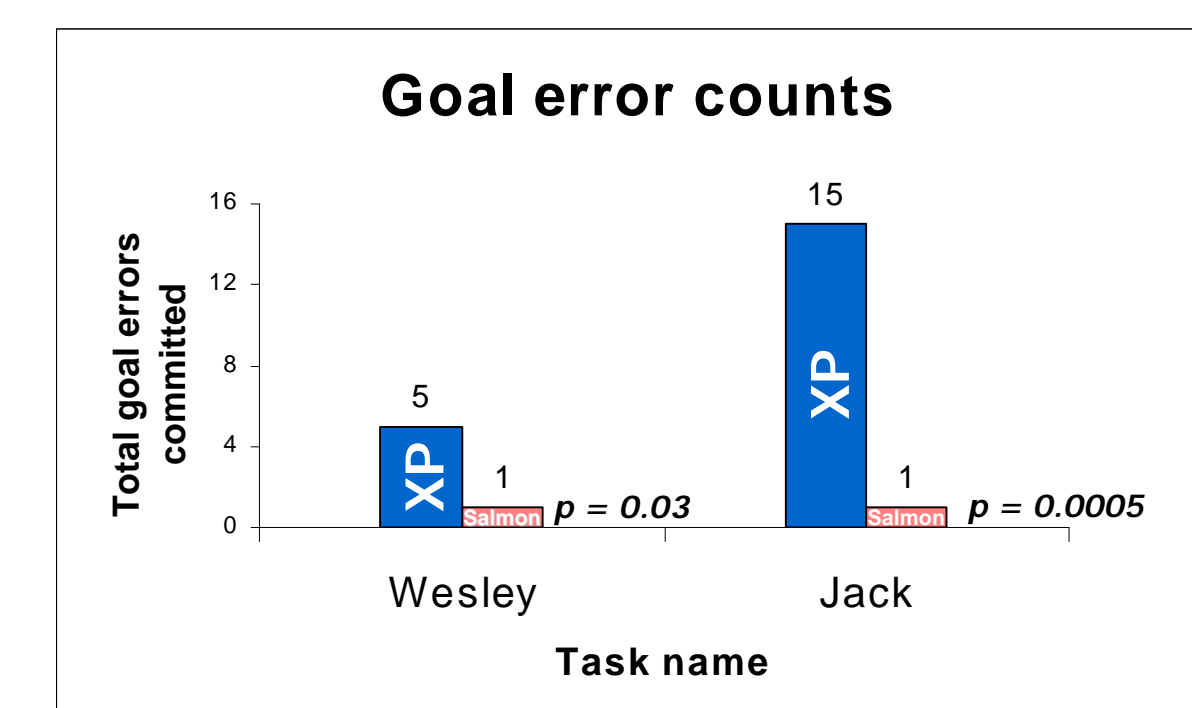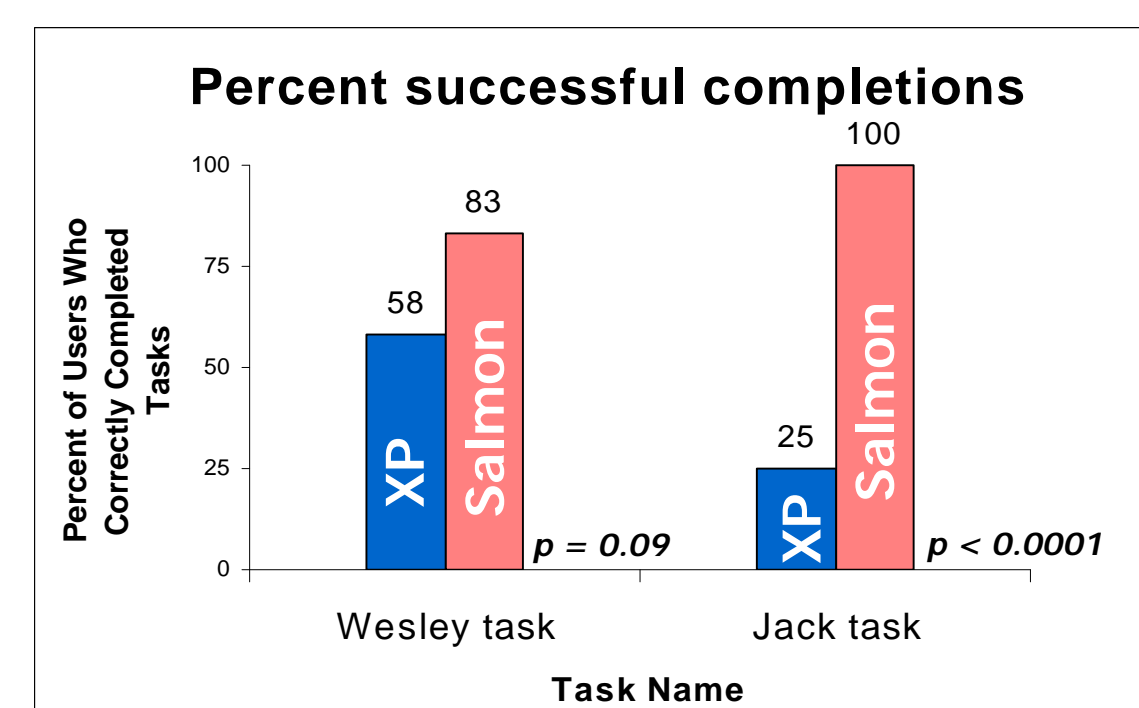
Accuracy: Salmon users improved up to 300% over XP users in accuracy

Goal Errors: Salmon users committed up to 94% fewer goal errors than XP users did.
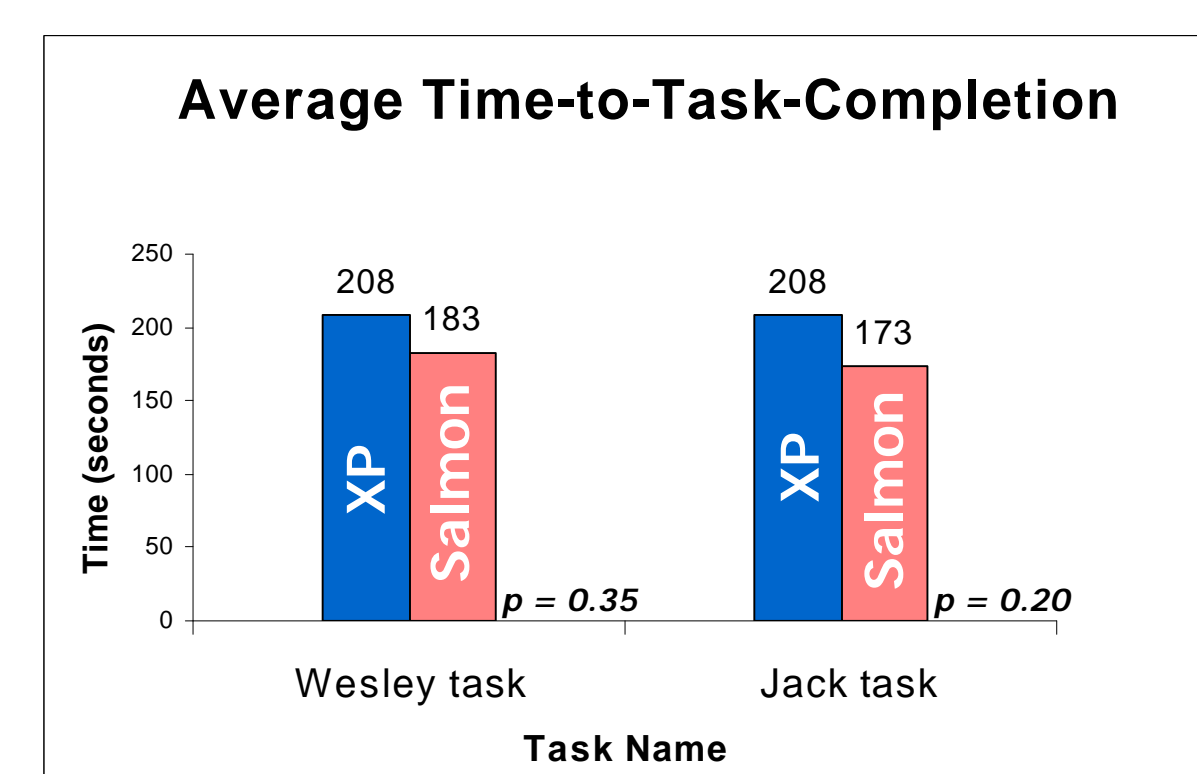
Speed: Successful Salmon users completed tasks moderately faster, on average, than their XP counterparts