Seeking and providing help in technology-based learning-by-doing situations

Lisa-Marie Babin, André Tricot,

Claudette Mariné & Gérard Poulain

Work & Cognition Lab., CNRS & University of Toulouse, France

France Telecom R&D, Lannion, France

Context

- When they discover new software, service, or information system, people have to learn how to use it
- This learning is often achieved by doing rather than by reading user manual (Mallen, 1996)
- During this phase of training, the individuals produce errors, that can reach them to deadlocks
- However, learners needing assistance do not systematically seek or use help, even when it is available (Aleven *et al.*, 2003)

Aims of the study

1) Identify the users' need of assistance when they take in hand a new information system, in order to provide them with efficient help

2) Assess the efficiency of help according to
   – Its nature (procedural vs non-procedural)
   – The users' level of expertise (novices vs experienced users)
   – The scenarios (help provided after a user's request vs after a deadlock detected by the system)
   – The intrusion of help (imposed vs proposed)

Framework : learning by doing classic situation

- Tower of Hanoï problem was used. It enabled us to characterize:
  - Sequences of actions corresponding to deadlocks
    - repetition of the same sequence of actions
    - return at an initial state
    - violation of an instruction, etc.
  - The nature of the help, which can be
    - procedural help (indicates a relation between the actions and theirs consequences to reach the goal)
    - nonprocedural help (not in direct relationship with a goal, it consists in pointing out a general rule)
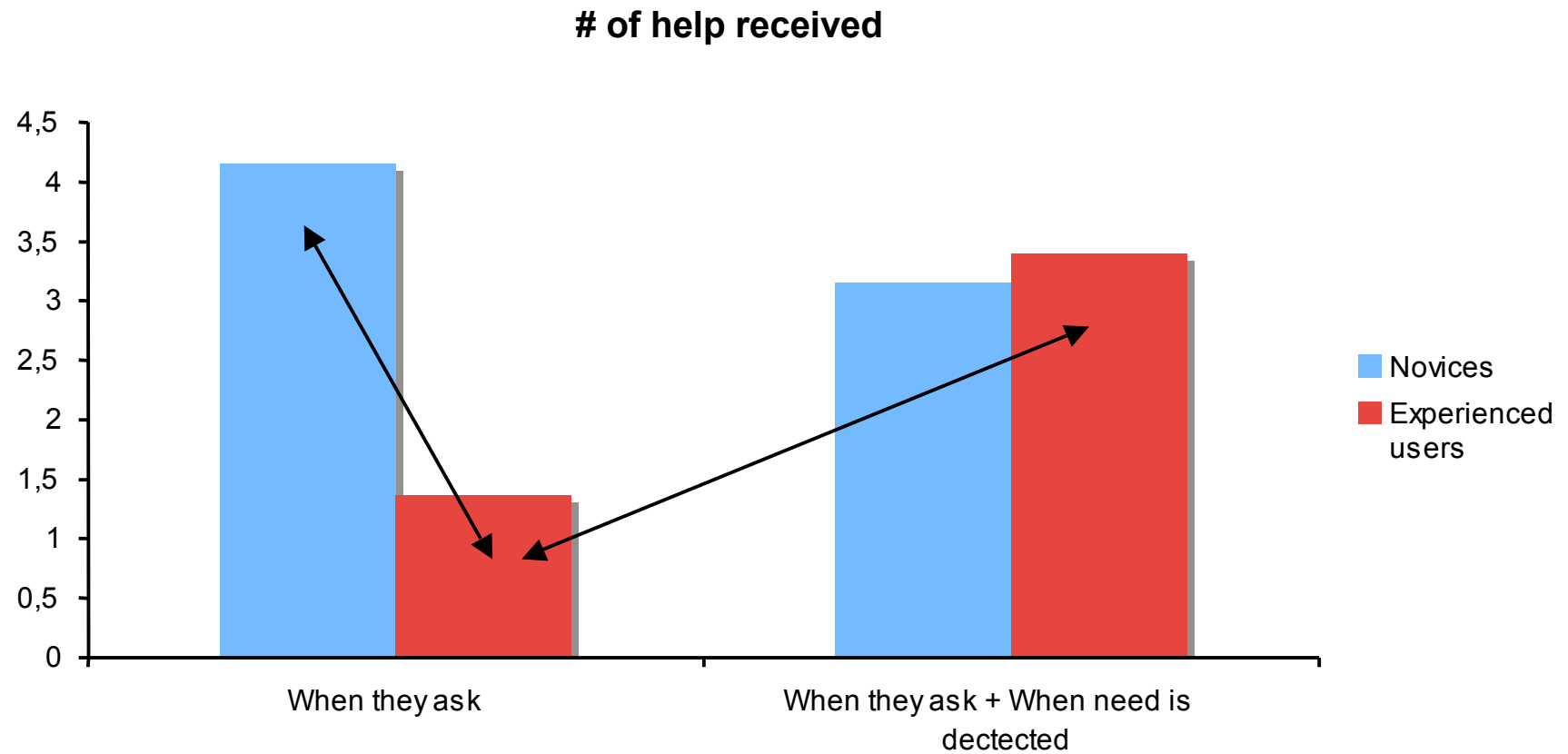
Experiment 1. Method

- Participants
  - 55 participants (average age = 35); they don't know the system
  - 29 experienced users in Photo index services, 26 novices
- Material
  - Photo index service
  - Wizard of Oz protocol
  - Participants were considered needing help when:
    - There is an error message from the system (action is impossible to do)
    - They repeat the same action several times without result
    - They return at the same place several times without result
- Tasks: 3 set of tasks
  - Discovery phase: 8 tasks
  - Practice phase: 5 tasks, similar to previous ones
  - Transfer phase: 2 tasks including 1 new

Experiment 1. Method

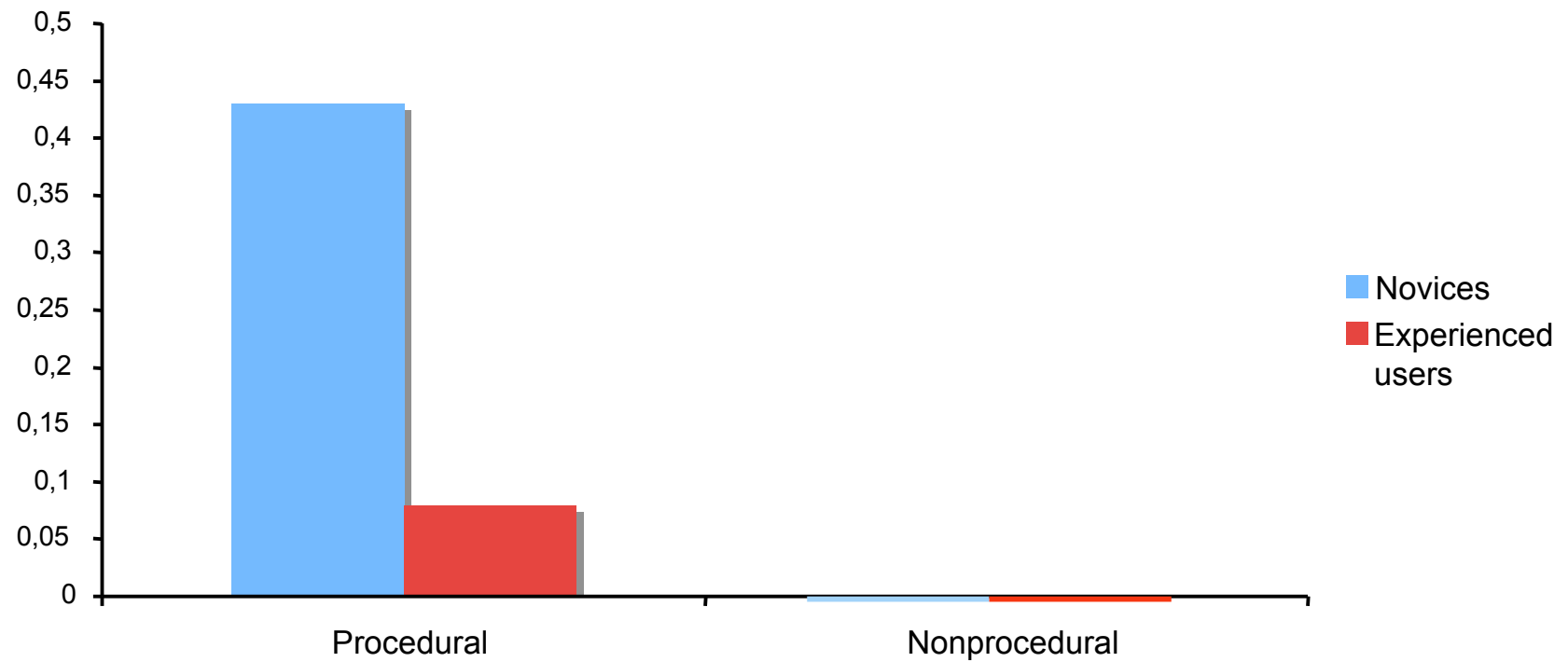|	Receive help when they ask for	Receive help when they ask for AND when they were considered needing help
Procedural help	Novices Experienced users	Novices Experienced users
Nonprocedural help	Novices Experienced users	Novices Experienced users

Experiment 1. Results

**failures ratio in the transfer phase**

Discussion

- Experienced users seek less help than novices
- Novices seek more help than they receive
- Nonprocedural help seems more efficient to learn
- Procedural help is sometimes more efficient for novices (in practice session), not to learn but to use "here and now" the system

Experiment 2. Method

- Aim: Replicate the results with another information system (assistant to web search, using natural language & speech)
- Participants:
  - n = 47 (average age = 41,4)
  - they don't know the system
  - experienced with computers and IT or novices
- Procedure: replication of exp. 1
- Tasks
  - Discovery phase: 8 tasks
  - Transfer phase: 4 tasks including 2 news

Experiment 2. Results

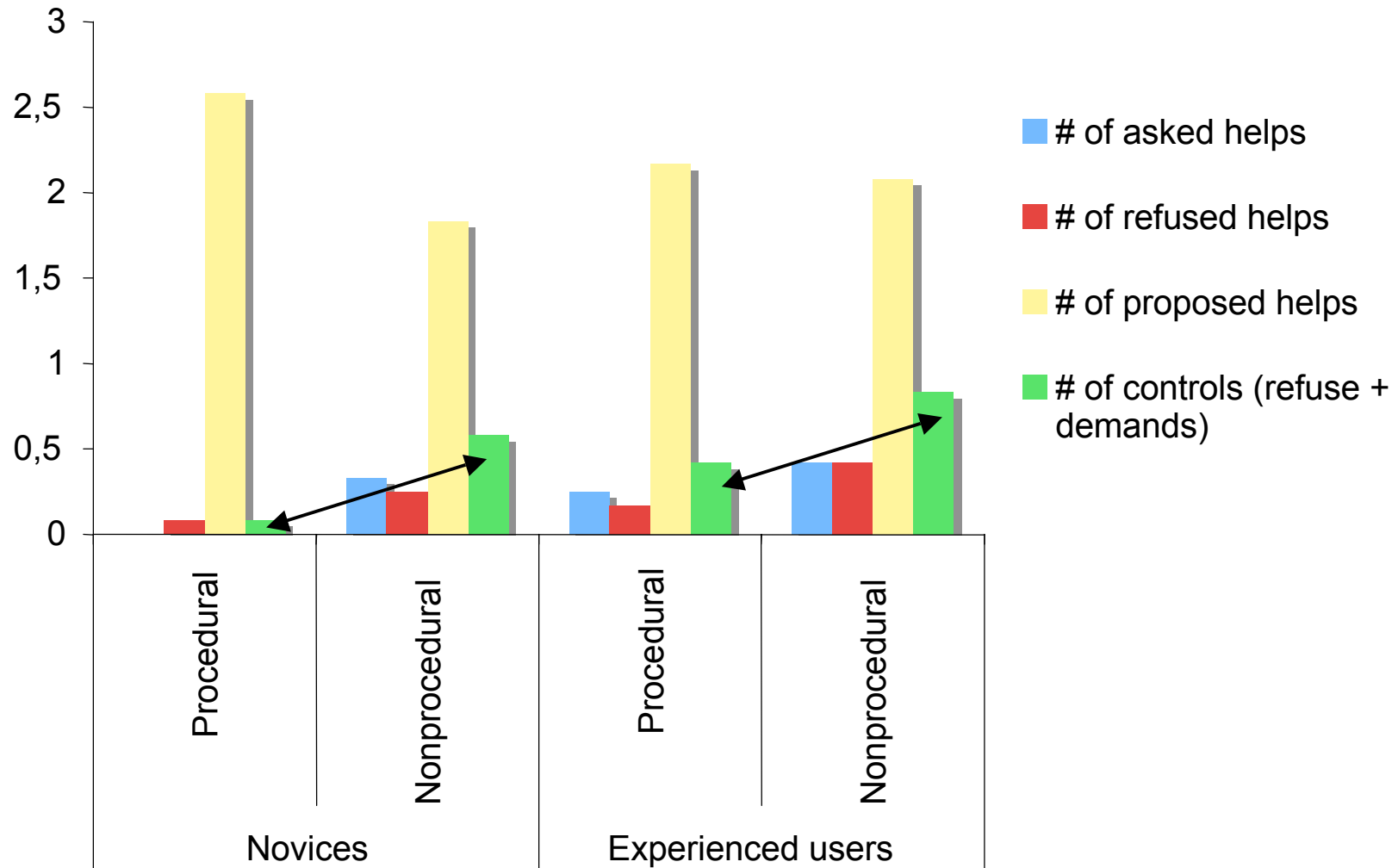**Performance (ratio) in information seeking tasks**
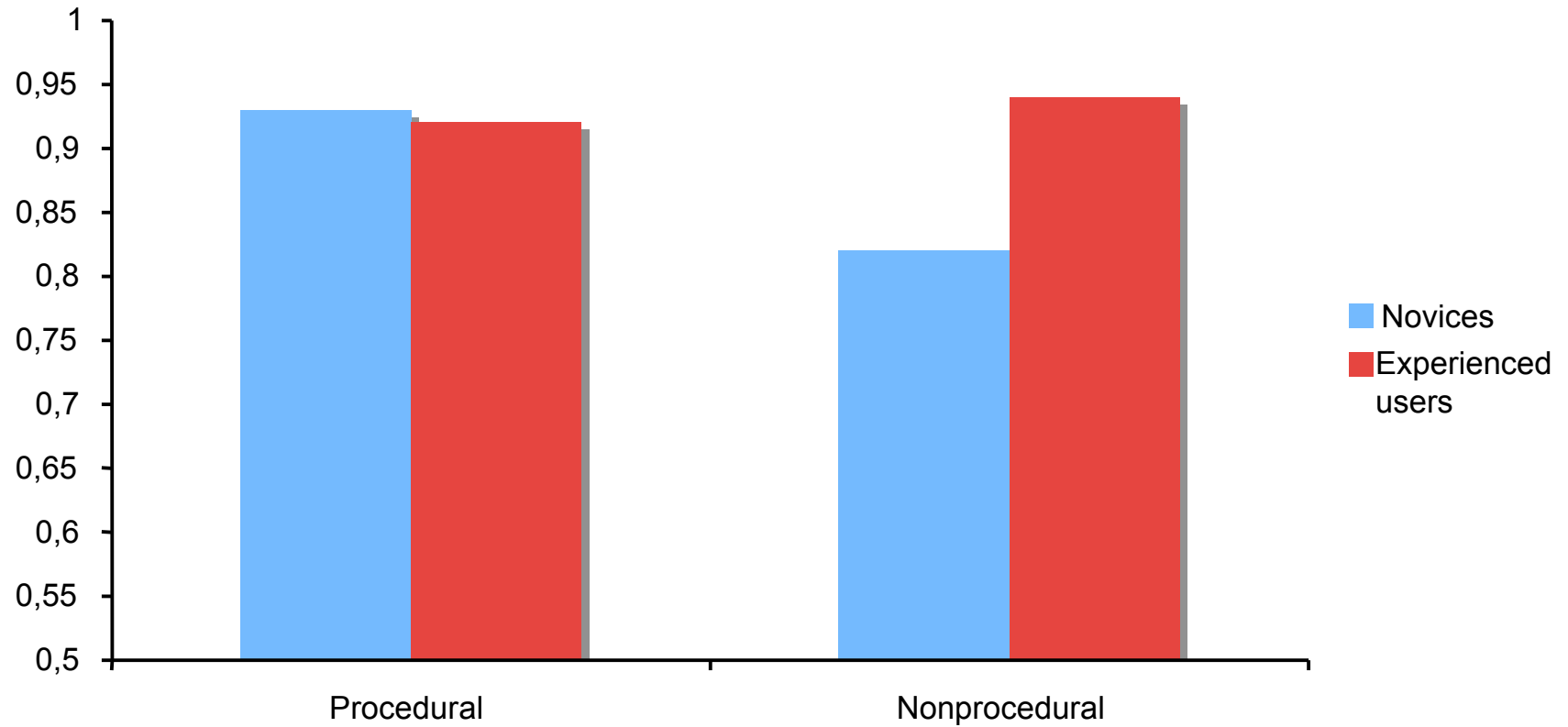
Discussion

- Performance: no significant difference between groups
- Time:
  - Procedural help: better for novices
  - Nonprocedural help: better for experienced users

Experiment 3. Method

- Aim: Explore if proposed help is more efficient than imposed help
- Participants
  - n = 48 (average age = 39)
  - they don't know the system
  - experienced with computers and IT or novices
- Procedure: replication of exp. 2, but
  - It was not exactly the same material (it has been improved)
  - Participants should refuse or accepted the help

Experiment 3. Results

- # of asked helps
- # of refused helps
- # of proposed helps
- # of controls (refuse + demands)

Novices — Procedural — Nonprocedural

Experienced users — Procedural — Nonprocedural

Experiment 3. Results

Performance (ratio) in information seeking tasks
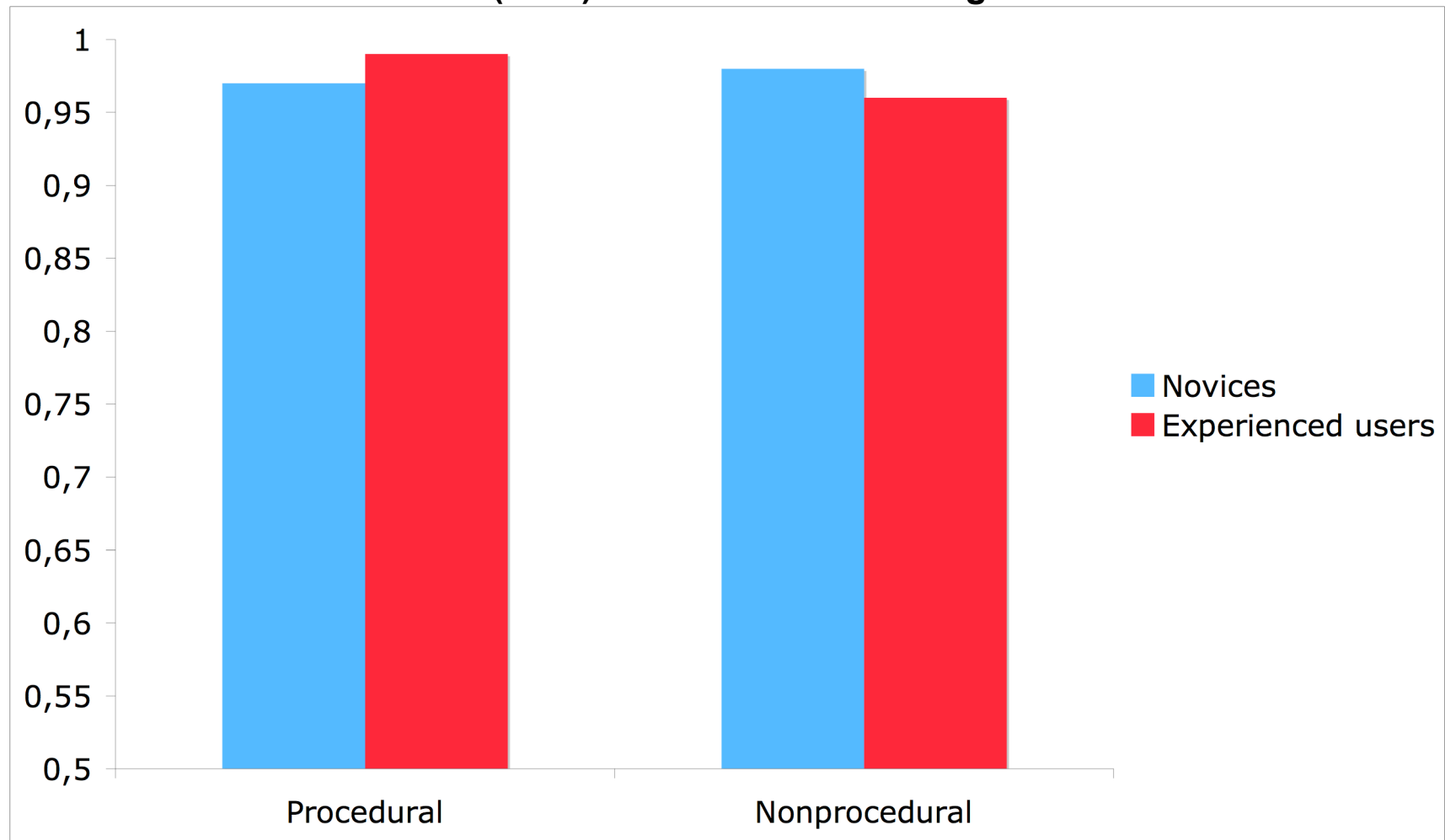
Discussion

- Proposed help are very rarely refused
  - But were not numerous (the performances were very good)
- Nonprocedural helps seem to involve a more active behavior (helps are more refused, more sought)
- Procedural helps seem to involve a more passive behavior
- No effect of help content, nor of expertise

General discussion

- Help needs and difficulties detection
  - Several users are not aware of some difficulties
  - Several users don't seek help even if help is needed
  - Indications of difficulties have to be used to propose helps even if help is not sought
- Prior knowledge
  - Experienced users detect better their help needs
  - Experienced users are not disturbed by adaptative helps (sent by system)

General discussion

- Adaptative helps (sent by system)
  - Are more efficient for learning (than help on demand only)
  - In particular for novices, when they discover the system
  - The users should can choose to accept or to refuse this help (proposed help are very rarely refused)

General discussion

- Help content
  - Procedural helps save time
  - … are more appreciated
  - … but are less efficient for transfer tasks
  - … and for experienced users
- When helps are proposed
  - Nonprocedural helps seem to involve a more active behavior (helps are more refused, more sought)
  - Procedural helps seem to involve a more passive behavior