Presentation of "Putting safety in the driving seat"

Putting Safety in the Driving Seat

Tracy Ross, TTEC

Loughborough University

t.ross@lboro.ac.uk

Transport Technology
TTEC
Ergonomics Centre

Loughborough University

Loughborough University

Research School in Ergonomics & Human Factors

Ergonomics & Safety Research Institute (ESRI)

Vehicle Safety Research Centre (VSRC)	**Transport Technology Ergonomics Centre (TTEC)**	**Human Focused Design Centre (HFDC)**
Accident investigation Crash worthiness Occupant protection Safety research **25 staff**	Vehicle telematics Physical ergonomics Vision/conspicuity Mobile comms **12 staff**	Product design Safety Strategy Inclusive design Usability **13 staff**

Transport Technology
TTEC
Ergonomics Centre

Loughborough
University

In-vehicle systems

STANDARD

Primary driving controls
HVAC
Vehicle status
ICE

EMERGING

Navigation
Traffic information
Mobile office
Tolling

FUTURE

ACC
Collision warning
Vision enhancement
Driver status

Transport Technology
TTEC
Ergonomics Centre

Loughborough
University

The potential for overload

Information:

- Business appointment, unfamiliar town, late
- Multi-lane roundabout, take 4th exit
- Heavy traffic, wrong lane for exit
- Phone call from office re. the meeting

Result:

- Near miss on lane change
- Lose track of exit, take wrong turn
- Forget figures given by office

Transport Technology
TTEC
Ergonomics Centre

Loughborough
University

The informed passenger…

- "You need to move into the right-hand lane"
- "Watch out for the car on your inside"
- "Exit is the one after the church"
- "I'll take the phone call for you"

Transport Technology
TTEC
Ergonomics Centre

Loughborough University

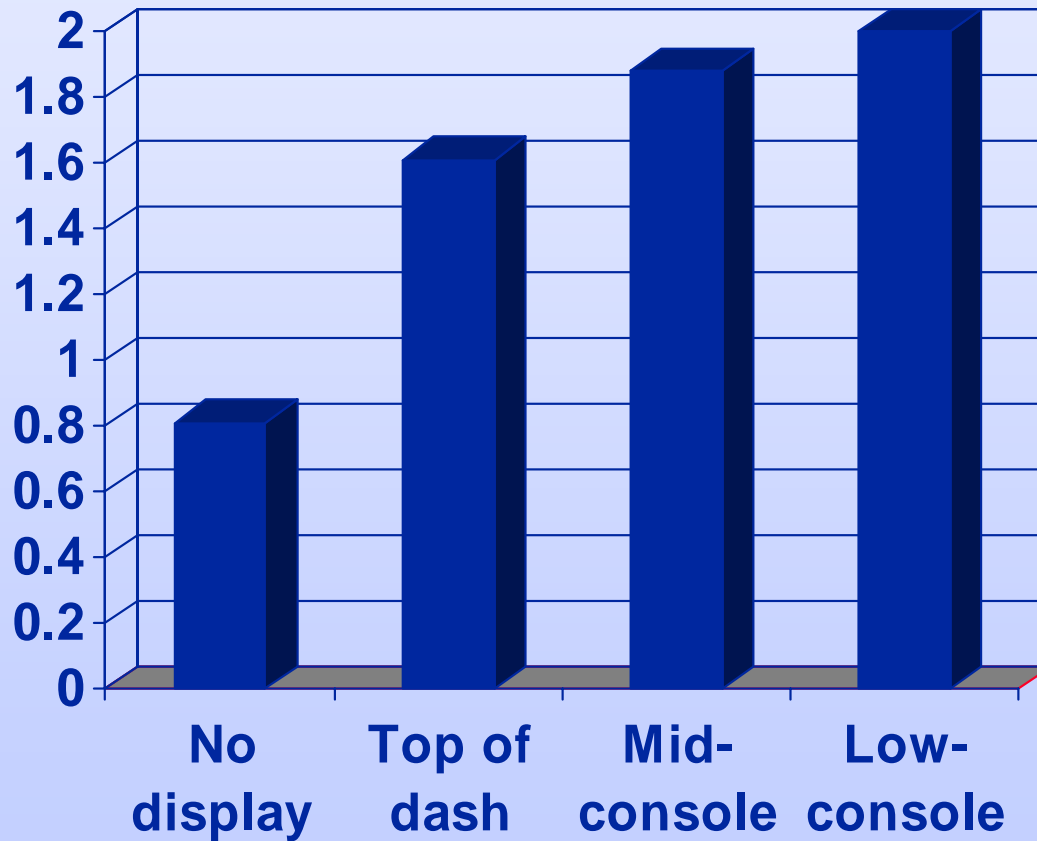# The informed passenger embodied in a system

- Natural interaction

- Managed information

- Novel solutions

If you need convincing…

% of journey time glancing towards areas of visual scene
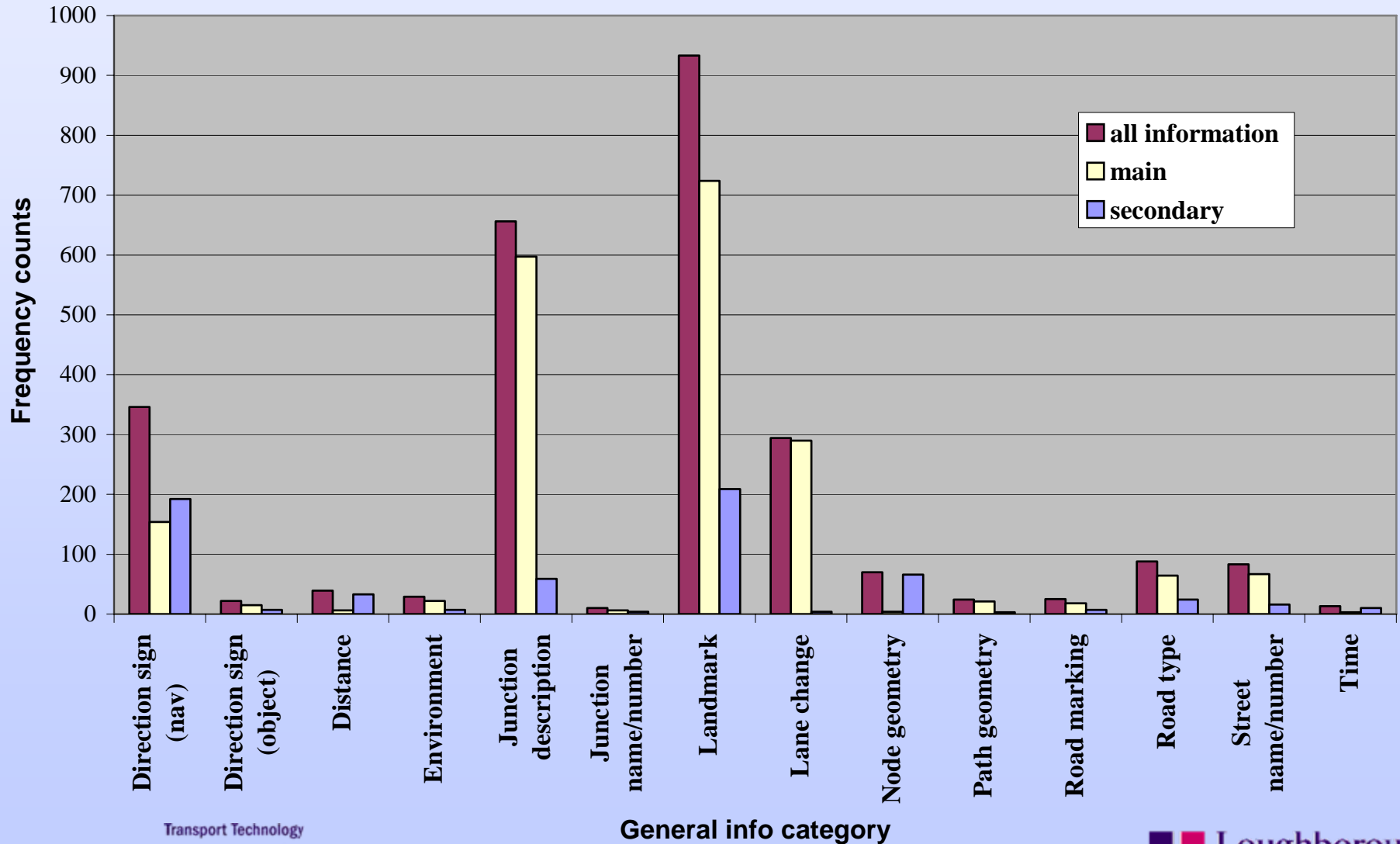
Passenger vs (Navigation System)

More evidence?

A bar chart titled with four categories on the x-axis and reaction time on the y-axis (0 to 2 seconds):
- No display: ~0.8
- Top of dash: ~1.6
- Mid-console: ~1.85
- Low-console: ~2.0

Legend: ■ Reaction time to pedestrian (seconds)

Transport Technology
TTEC
Ergonomics Centre

Loughborough University

Solutions

- Natural interaction: Navigation study 'REGIONAL'

- Manage information

- Novel solutions

Information used by drivers

Improved safety

Road trials comparing different HMIs
(Burnett, 1998)

	HMI using distance-to-turn	HMI using landmarks
Typical in-vehicle display views		Postbox
Typical voice instructions	+ "Turn right in 200 m"	+ "Turn right at the Postbox"
Average number of glances to Navigation Display on final approach to turning	5.0	1.6

Transport Technology
TTEC
Ergonomics Centre

Loughborough
University

Solutions

Foresight Vehicle

- Natural interaction

PERA — THE INNOVATION COMPANY

- Managed information Integration study 'VIVID'

THALES

OCF

- Novel solutions

Transport Technology
TTEC
Ergonomics Centre

Loughborough University

The integration issue

- Reduce driver workload

- Increase usability

- Minimise safety implications

- Increase acceptance

Transport Technology
TTEC
Ergonomics Centre

Loughborough University

The VIVID Tool

Environment　　　　　　　*Driver behaviour*

Rule base

Priorities

Timing

Road layout

Messengers　　　　*Waypoints*

TTEC
Transport Technology
Ergonomics Centre

Loughborough University

Application of VIVID

1. Dealing with conflicts

2. Scheduling of information

3. Mental models

Transport Technology
TTEC
Ergonomics Centre
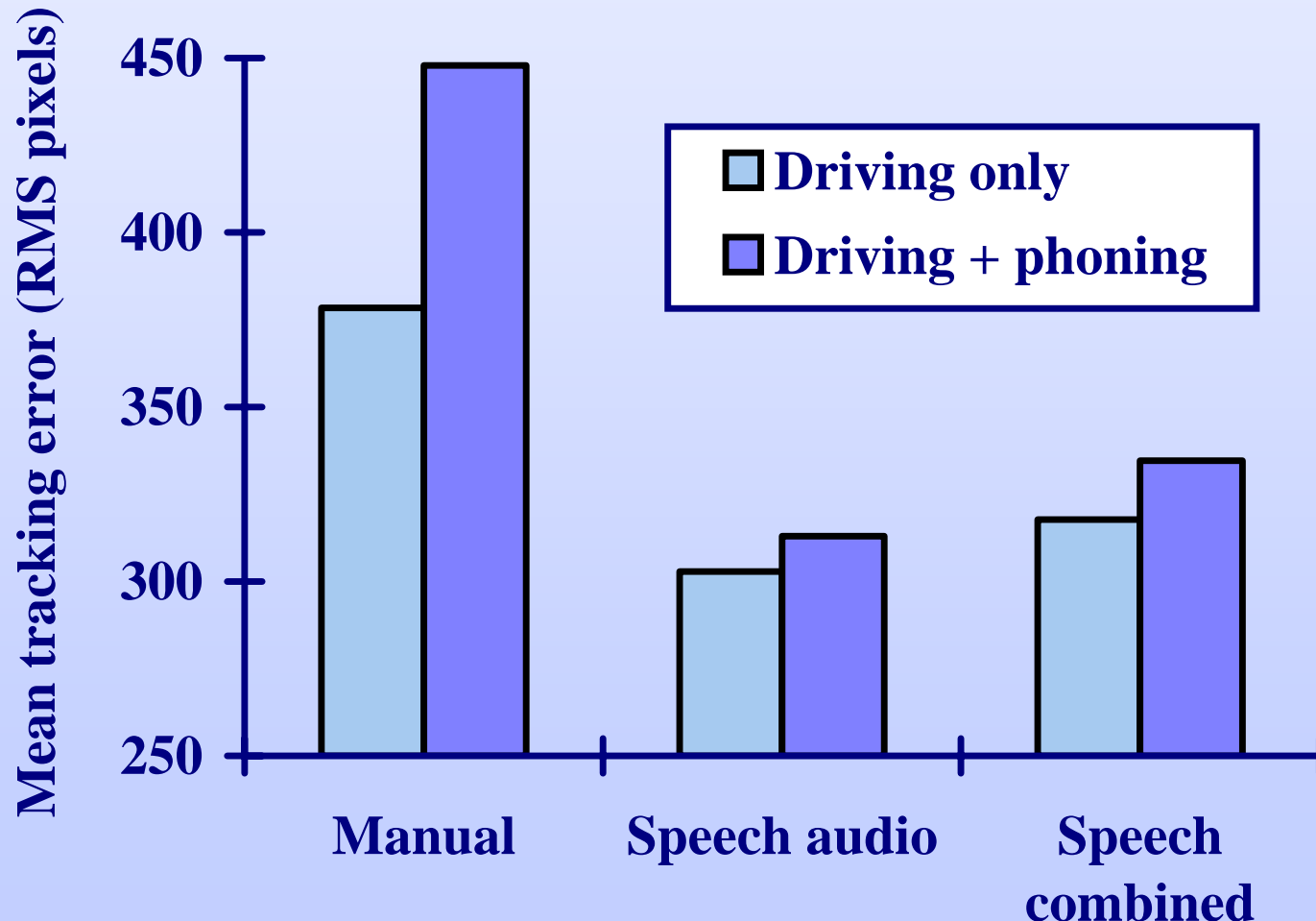
Loughborough University

Solutions

- Natural interaction

- Managed information

- Novel solutions
  Speech recognition study
  'SPEECH IDEAS'

Telephone speech dialling

- Digits from memory

- Manual
- Speech (audio feedback)
- Speech (audio and visual feedback)

- Tracking task

Effects on tracking performance

Some current activity

- European Statement of Principles
  - HMI for in-vehicle information and communication systems

- ISO/TC 22/SC 13/WG 8
  - Visual distraction
  - Assessment of system suitability for use while driving
  - Message prioritisation
  - Driver-system integration

Transport Technology
TTEC
Ergonomics Centre

Loughborough University