Circumstantial and temporal dimensions of Acceptability/Acceptance of new driver support system

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Plan

Questions of definition and scope

A framework for studying “Acceptability”/”Acceptance” : the LAVIA Project

Circumstancial and temporal dimensions of acceptability : research questions

Definitions : Nielsen (1993)

Social Acceptability (norms, values)

Practical Acceptability (usability, utility, cost,..)

==> Various dimensions of acceptability

Definitions: Dillon and Morris 1996

“User acceptance is defined as the demonstrable willingness within a user group to employ information technology for the tasks it is designed to support”.

==> Idea of prescription

Thus, the concept is not being applied to situations in which users claim they will employ it without providing evidence of use, or to the use of a technology for purposes unintended by the designers or procurers (using internet for personal entertainment in a work situation).

Obviously there is a degree of fuzziness here since actual usage is always likely to deviate slightly form idealized, planned usage, **but the essence of acceptance theory is that such deviations are not significant**; that is, the process of user acceptance of any IT for intended purposes can be modelled and predicted.

Definitions: Schade & Schlag, 2000; 2003

"Generally, the construct can be conveniently described by questioning ''**acceptance of what**, **through whom and under which conditions and circumstances**''.

==> Contextual and circumstancial dimensions

The term **acceptability** describes the **prospective judgment** of measures to be introduced in the future. Thus the target group will not have experienced any of these measures, making ''acceptability'' an attitude construct.

Acceptance defines respondents **attitudes including their behavioral reactions after the introduction of a measure"**

==> Experience and time dimension

New driving support systems and behavioural changes

- **New driver assistance systems will mediate drivers' interactions with their driving environment (the vehicle, the road infrastructure, other users)**
  - New sources of information
  - and/or new means of regulating their activity
- **They will modify the conditions in which driving task is currently performed and, as a result, changes in driver activity can be expected**

==> Nature and magnitude of the changes ?

==> Acceptability of the changes induced by the use of the system ?

Scope for studying Acceptability / Acceptance

Acceptability / Acceptance will depend on:

- **The Goal / Function of the system**
- **The Mode / Means of support provided**
- **The Compatibility of the assistance provided with the other driving tasks**
- **The ease of Integration in the overall driving activity**

(Saad and Malaterre, 1982; Saad and Villame, 1999)

Framework of the LAVIA Project : Social and Functional acceptability (Lassarre and Saad, 2006)

The LAVIA is a new object for the drivers :

- **It has to be integrated in a system of pre-existent social representations**
  - Pre-existing social representations linked to the speed (SR of Speed, Speed limit, Speed camera) will determine the "**social acceptability**" of the LAVIA system and the structuring of its social representation.
- **It has to be integrated in well established practices** and **behavioural adaptation** will occur in response to its use
  - The nature and magnitude of the induced behavioural adaptations will determine the "**functional acceptability**" of the LAVIA system.

We assume that "functional acceptability" and "social acceptability" are **two dimensions that influence each other**

Acceptability of LAVIA (Pianelli, Abric, Saad, 2008)

Acceptability: intention of use in the futur (Schade et Schlag, 2003)

System accetability (Nielsen, 1993)

Social Acceptability
(Beliefs, attitudes norms..)

Pre-existing SR in the social environment and SR of the system

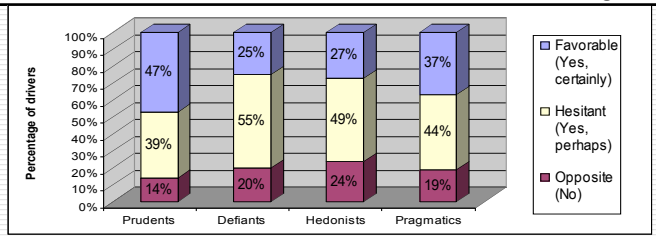
Social Representation (Abric, 1994)
- System of Interpretation of the world
- Socially built up
- Determining attitudes and practices

Functional Acceptability
(usability, utiliy, ease of learning and use, …)

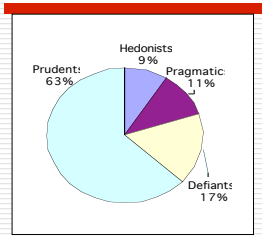
- **Integration in driving activities** (Saad et Villame, 1999)
- **Induced Behavioural Adaptations** (Saad, 2006; 2007)

Social representation of speed and a priori acceptability of LAVIA (N=281) Pianelli (2008)

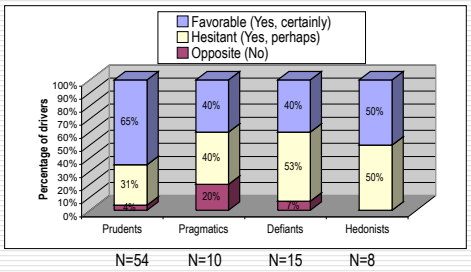
PRUDENTS (N=148, 53%)	DEFIANTS (N=34, 12%)	HEDONISTS (N=34, 12%)	PRAGMATICS (N=65, 23%)
Danger	Danger	Pleasure	Rapidity
	Pleasure	Rapidity	Gaining time
		Gaining time	Enforcement
			Vigilance



Characteristics of the participants in the experiment (N=87)



Proportion of the four groups within the population (N=87)

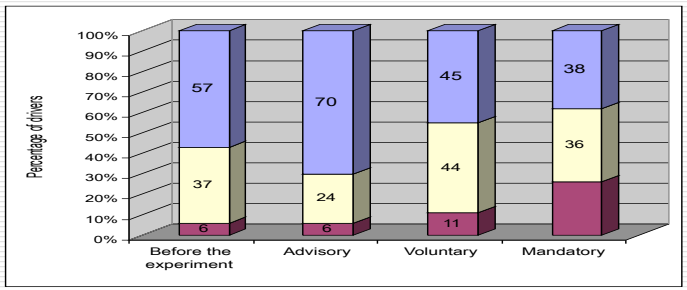


A priori acceptability of LAVIA in the four groups of drivers in the fleet (N=87)

Favorable: 56% (Experiment) / 31% (Survey)
Hesitant: 38% / 45%
Opponent: 6% / 23%

Acceptability of LAVIA after the experiment (N=87) (Pianelli, Abric, Saad, 2008)

Two weeks with each of the three LAVIA modes



Acceptability depends on the level of constraints and on the induced behavioural adaptations

Functional dimensions of acceptability

Perceived advantages of using LAVIA

Active modes have a greater impact on drivers' behaviour and their compliance with speed limits than the advisory mode

"LAVIA enables to avoid exceeding the speed limit through inattention": (Advisory: 69% *versus* Voluntary: 97%; t=-3,685, p<.001; Advisory: 69% *versus* Mandatory: 97%; t=-4,838, p<.0001)

BUT

Problem situations encountered when using LAVIA

Drivers encounter more problem situations with the two active modes than with the advisory mode

"LAVIA creates problems when merging into traffic" (Advisory: 18% *versus* Voluntary: 63%; t=-6,955, p<.001; Advisory: 18% *versus* Mandatory: 67%; t=-9,014, p<.0001)

SO

Perception of driving with LAVIA

Drivers have a more positive perception of driving with advisory LAVIA than with the active modes (5 dimensions: Pleasure, Safety, Comfort, Pleasantness and Ease of use)

"Pleasure of the driving"(Advisory: 78% *versus* Voluntary: 60%; t=2,277, p<.05; Advisory: 78% *versus* Mandatory: 59%; t=3,366, p<.001)

Conditions likely to increase acceptability

Drivers indicated more conditions for the active modes than for the Advisory one (Advisory vs Active Voluntary : t=-3,974, p<.0001; Advisory vs Active Mandatory : t=-5,216, p<.0001)

The more drivers are opposed to the active modes, the more they selected conditions

	Overall	Opponent	Hesitant	Favourable	Significance
Advisory	2,2	2	2,1	2,2	NS
Active Voluntary	2,7	3,5 [a]	2,6 [b]	2,5 [b]	Opp vs Hes : t=2,047 ; p<.05 Opp vs Fav : t=3,727 ; p<.001
Active Mandatory	2,8	3,2 [a]	2,9	2,5 [b]	Opp vs Fav : t=2,235 ; p<.05

Conditions likely to increase acceptability

Better adaptation of the speed limit to the road infrastructure

- **Relevance and functionality of the speed limits in force**

All vehicles equipped with the LAVIA

- **Collective dimension of the driving task and priority to interaction with other road users.**

Improving the accuracy and the reliability of the system

- **Confidence in the system / quality of the speed limit data base**

Discussion : Circumstantial Dimensions

Behavioural changes, use and acceptability depend on:

- **The situational context (infrastructure and traffic related) and the tasks to be carried out**
- **The characteristics of the drivers (driving style; level of experience; …)**

➢ **Would Adaptability /Adaptiveness of the support systems improve their use and acceptance ?**

➢ **What level of adaptability would be appropriate /safety ?**

Discussion : Temporal dimensions

Anchoring process : SR of LAVIA depend on pre-existing SR of Speed

SR of Speed and LAVIA influence the *a priori* acceptability of the system

Adjustment process : Using the LAVIA has a major impact on the *a posteriori* acceptability of the three modes

Discussion : Temporal dimensions

Learning and appropriation phases
The driver discover the system, learn to interact with it and identify the scope and limits of the assistance provided

Integration phase
With practice, the driver reorganise his/her driving and integrate the support system in the management of the overall driving task

⇨To what extent learning and practice would influence use and level of acceptance ?

⇨ Important to evaluate the time span of these phases and to identify means likely to optimise the learning and integration process

Discussion : Some critical issues (Saad, 2007)

Circumstantial and temporal management of the assistance provided to the driver(s) (short and long term, diversity of the driver population)

Time diffusion of the support systems

Learning issues and training ?

Compromise between efficacy and acceptability ?

Methodological issues : promoting integrated approaches