

# Designing The User Experience of Biometric Systems

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## UXP – “Usability+”

- Usability
  - performance, user satisfaction, user cost
- Universal access (especially public sector applications)
- UXP
  - “Lived Experience” – impact of technology on users’ lives, immediate and long-term
  - Cost
  - Expectations and perceptions

## Usability – still much to be done

*“Biometric systems attempt to elicit repeatable and distinctive human presentations, and consist (in theory, if not in actual practice) of user-friendly, intuitive interfaces for guiding the user in presenting the necessary traits.”*

**Jain, Ross & Pankanti: Biometrics: A Tool for Information Security.  
IEEE Transactions on Information Forensics & Security, Vol. 1(2), 2006**

## Example: Project IRIS

- User has to position body to equipment and align characteristic to system target
- Feedback too slow to be useful
- Anti-tailgating barriers slow down practised users
- System failures at busy times
- No backup – most terminals have only one booth
- Queues building up at busy times as more users have enrolled

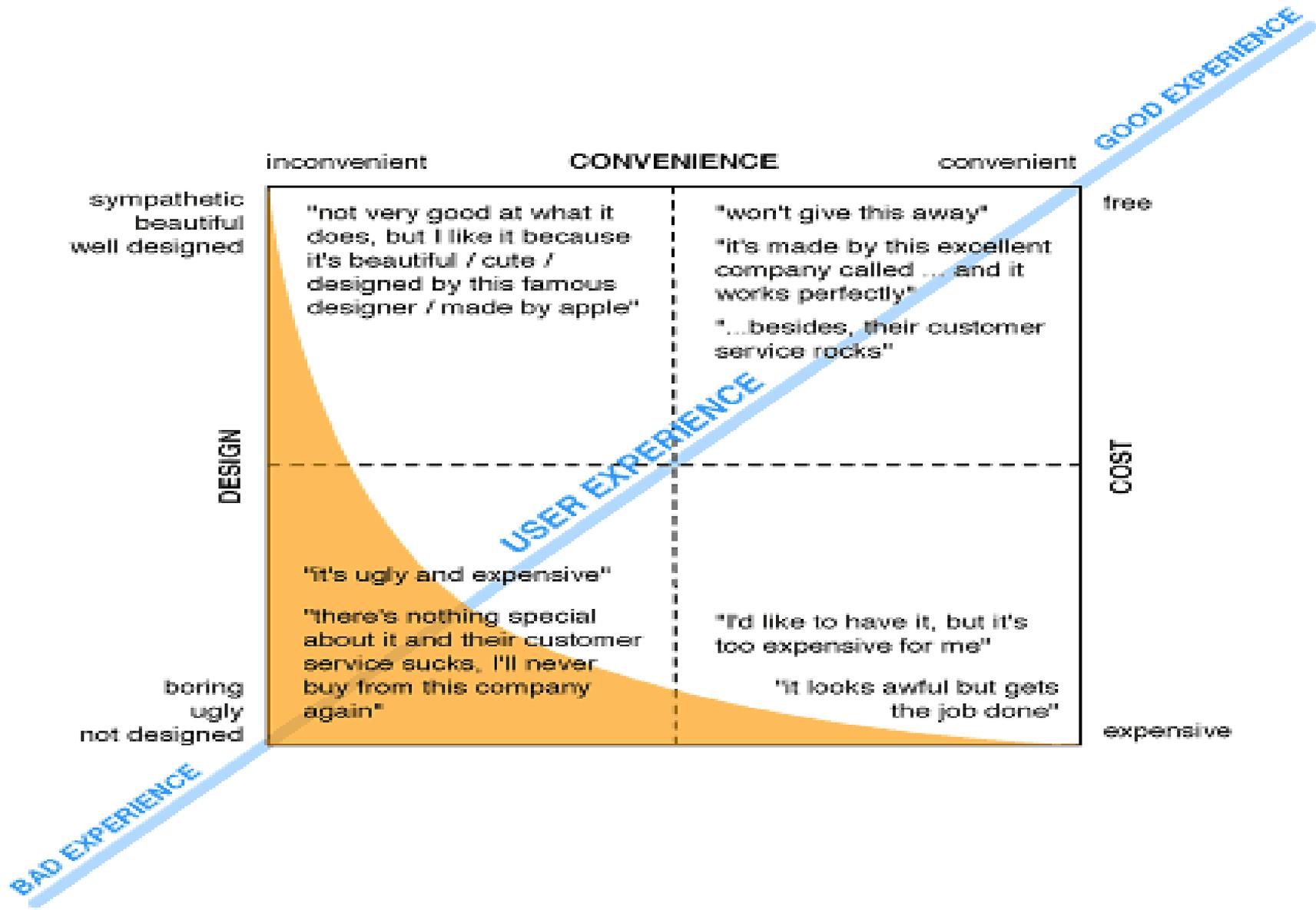
## Universal Access

- Much to be done
- Significantly longer times, and higher FRRs, for disabled users in enrollment and verification in UK Passport Service trial 2004

[http://www.passport.gov.uk/downloads/  
UKPSBiometrics\\_Enrolment\\_Trial\\_Report.pdf](http://www.passport.gov.uk/downloads/UKPSBiometrics_Enrolment_Trial_Report.pdf)

- Commercial fingerprint readers do not provide instructions or feedback for visually impaired users

[http://www.tiresias.org/biometrics/fingerprint\\_index.html](http://www.tiresias.org/biometrics/fingerprint_index.html)



## UXP issues

- Acceptability of interaction
  - Contact with equipment widely disliked
  - Meaning of procedures (“being fingerprinted”)
  - Impact of “public” rejection

## Worries, worries, worries

- Health & safety
- Reliability, and impact of failure on users’ lives
- Function creep and privacy

# The Hygiene Factor



# Lived Experience – Impact on users' lives

BBC NEWS | UK | 80,000 passport photos rejected - Mozilla Firefox

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## 80,000 passport photos rejected

Tens of thousands of photos in passport applications have been rejected for failing to meet new rules introduced in September last year to combat fraud.



The UK is one of 40 countries preparing biometric passports

UK Passport Service (UKPS) figures showed that of 597,863 applications in the eight weeks from 12 September some 81,927 photos - 13.7% - were rejected.

The most common problems were obscured eyes, an unsuitable facial expression and incorrect paper, the UKPS said.

A spokesman said rejections were now below 10% and would continue to fall.

UKPS had expected 20-25% of photos to be rejected immediately after the rules came in.

"We thought there would be far more rejections initially but the public is getting used to the new rules," the spokesman said.

**SEE ALSO:**

- UK passport price to rise to £51 17 Nov 05 | UK
- New passport photo standards due 05 Sep 05 | UK
- Passport applicants face grilling 28 Jun 05 | Politics
- 'No decision' on passport prints 12 Apr 05 | Politics
- Interviews for passports in 2006 24 Mar 05 | UK

**RELATED INTERNET LINKS:**

- UK Passport Service

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## Impact on everyday life

- No more changes in hair & makeup?
- Same glasses/contact lenses for life?
- No more smiling when you say hello?
- Need to design systems & processes that don't get in the way of life and development

*“In security, we should aim not just for utility and usability, but to provide luxury solutions.”*

Philip Hallam-Baker, Verisign

## Concerns about Security and Privacy

- Low confidence that data will be kept secure
- Creating unknown risks/new types of attack
- Fear that development of technology enables new threats to privacy
  - Capture at a distance
  - More information that can be deduced (health, personality)
  - Integration of identification and monitoring/tracking data (CCTV, GPS, RFID)

**BBC NEWS** WORLD EDITION

Last Updated: Thursday, 31 March, 2005, 10:37 GMT 11:37 UK

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## Malaysia car thieves steal finger

By Jonathan Kent

BBC News, Kuala Lumpur

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**Police in Malaysia are hunting for members of a violent gang who chopped off a car owner's finger to get round the vehicle's hi-tech security system.**

The car, a Mercedes S-class, was protected by a fingerprint recognition system.

Accountant K Kumaran's ordeal began when he was run down by four men in a small car as he was about to get into his Mercedes in a Kuala Lumpur suburb.

The gang, armed with long machetes, demanded the keys to his car.

It is worth around \$75,000 second-hand on the local market, where prices are high because of import duties.

# Trustguide

<http://www.trustguide.org.uk>

- Aim: understanding the beliefs and needs of users in relation to trust, security and privacy in ICT mediated activities
- In-depth qualitative research (not just opinion polls)
  - Topics:
  - Risk and responsibilities
  - ID cards: An aid to security?
  - Use of Biometric data
  - Privacy and health information
  - E-Government and Public Sector I T

*“Citizens believe there is no such thing as a secure service and claiming so leads to mistrust. A more effective method of engagement is to clearly state the measures that are in place in the event of something going wrong. Provide assurance and improve confidence in whether to enter into a transaction through guarantees of restitution.”*

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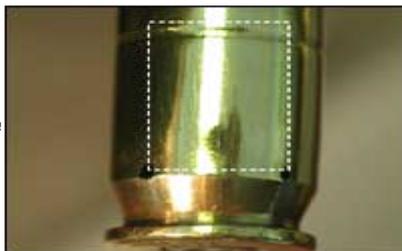
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## Fingerprints hide lifestyle clues

By Mark Ward  
Technology correspondent, BBC News website

**Fingerprints could soon help police narrow down their list of suspects by giving clues about the lifestyle of whoever left the prints at the scene of a crime.**

Researchers in the UK are uncovering the ways fingerprints are changed by age, smoking, drug use and even some personal grooming products.



The technique can spot prints invisible to naked eye

The work also promises to help obtain good quality copies of prints that have gone unnoticed for days or weeks.

Related work aims to find prints on guns and bomb fragments that are often among the most difficult to recover.

Led by Dr Sue Jickells from Kings College, London, the work on getting more from fingerprints started by looking at the chemical components of prints and how they change over time.

Dr Jickells said much of the material left behind when people touch anything are fat molecules, or lipids.

"There are a lot of lipids in fingerprints," said Dr Jickells, "and there are a lot of possibilities for that."

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12 May 02 | Panorama
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## How irises 'reveal personalities'

**It may be possible to read a person's personality through their eyes, Swedish researchers have said.**

They have detected patterns which show warm-heartedness and trust or neuroticism and impulsiveness.



Patterns in the iris can give away the secrets of your personality

The team from Orebro University read pits and lines in the irises of 428 people.

Experts said the study in Biological Psychology showed that at least some aspects of personality were determined by genetics.

Close-up pictures were taken of the study participants' irises, and they also filled out a questionnaire about their personalities.

**“ You would not want to arrest somebody on the basis of their iris ”**

Dr George Fieldman, psychologist

The researchers looked at crypts (pits) and contraction furrows (lines curving around the outer edge of the iris),

**SEE ALSO**

- Eye scans 'mean airport delays' 10 Jan 07 | Politics
- Eye test 'could spot Alzheimer's' 22 Jul 06 | Health
- Prematurity 'affects personality' 27 Feb 06 | Health

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## Conclusions – Bad UXP

- Inconvenience
  - Creating physical/mental workload for users
  - Failure to integrate with users goals & tasks
  - Failure to function in real-world operating environment
- High cost
- Over-hyped expectations
- Things that users worry about
  - Health & safety
  - Privacy

## Conclusions – Good UXP

- Research your customers (especially the not so obvious ones)
- Design a service, not a stand-alone system
- Aim for luxury, not just utility/usability
- Budget time and resources for usability testing and system shaping
- Manage expectations
  - Be honest about risks and benefits
  - Design procedures for redress and recompense

# Questions?

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**“Sorry about the odor. I have all my passwords tattooed between my toes.”**