## A designerly approach to interactive cross-language information retrieval

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## The User-Centred Design Process





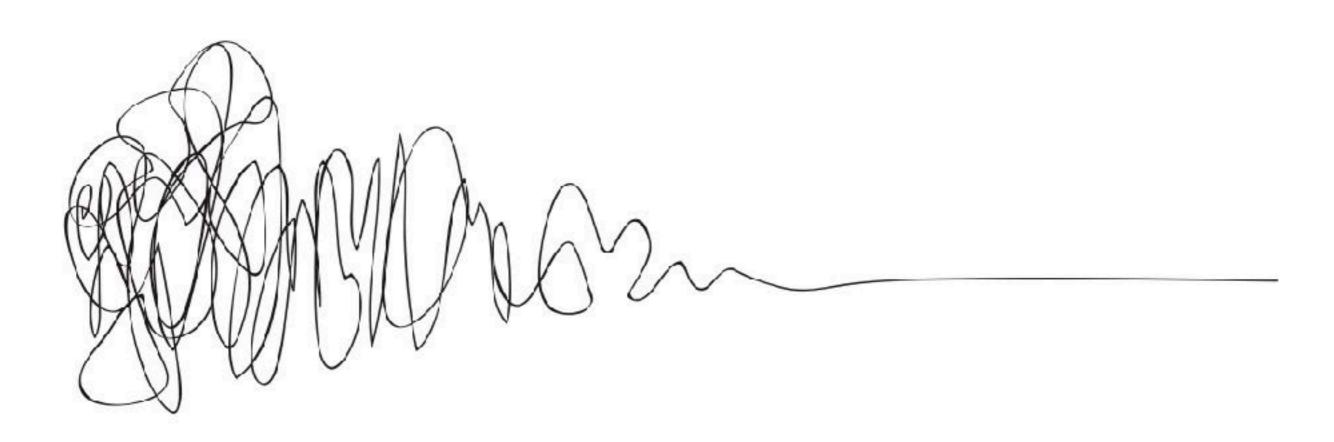


image from: www.usability.gov

# The Design Process

uncertainty / insight

focus / implementation



exploration

concept / prototype

product



The Process of Design Squiggle by Damien Newman (CC)

### **Cross-language information retrieval (CLIR)**

the retrieving of information written in a language different from the language of the user's query

a user types in English to retrieve documents written in French

CLIR systems use automatic translation techniques





## **Information Retrieval**

Search terms



**Documents** 

**Relevant documents** 





### **Cross-language Information Retrieval**



English user







# Cross-language Information Retrieval step 1: query translation

Search terms in English



English user

Search terms translated in Finnish







# Cross-language Information Retrieval step 2: search and retrieval



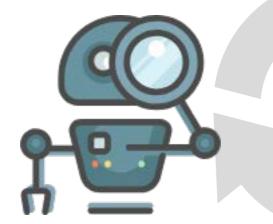
English user

Search terms translated in Finnish

**Relevant** 

documents

in Finnish





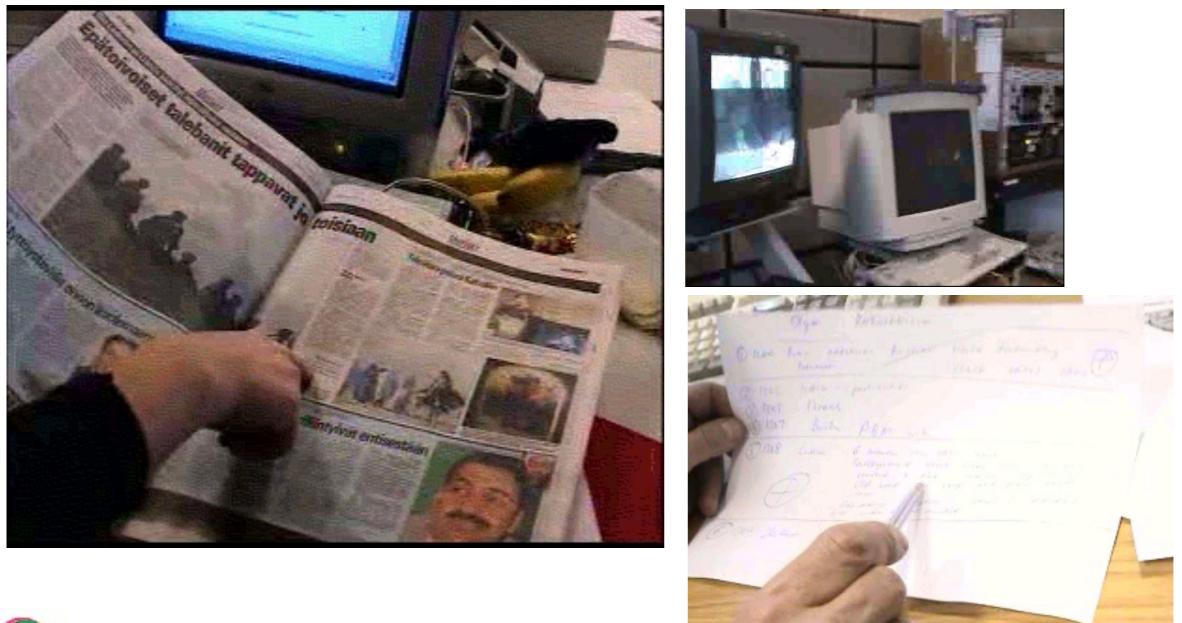


## Who is the user? What does s/he want to do? Why?





# Ethnographic study (2001): observations, interviews, questionnaires

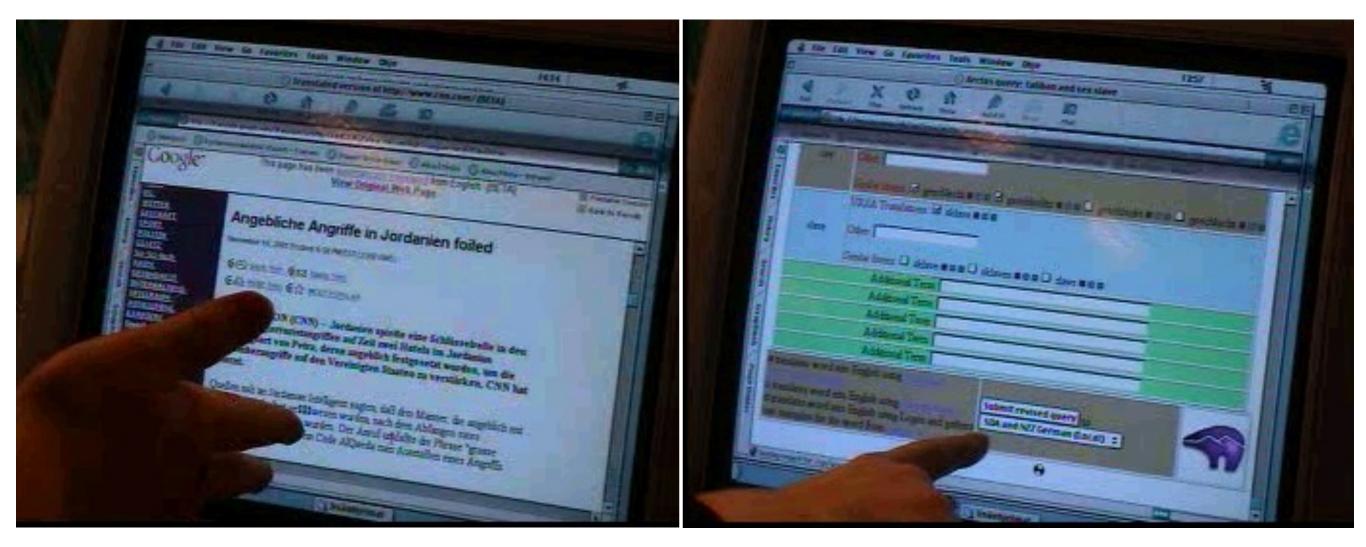


Sheffield

Universitu



## Ethnographic study (2001): evaluations of exisitng tools



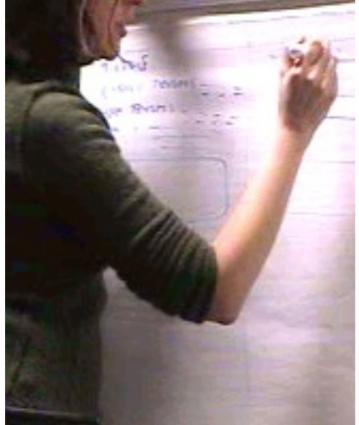


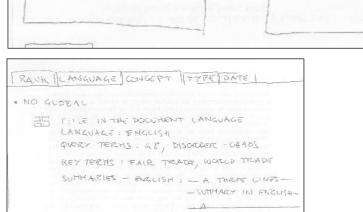


# Ethnographic study (2001): participatory design of user interaction



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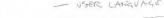
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> > \_ LANGVAGE ----

-FINNISH : - A SUMPARY IN -- USER LANGVAGE







Journalists

*what*: receive brief / team work search / check news

why: gain international perspective

how: browse reliable sources

*needs*: widen their language skills ok with automatic translation

**Business Analysts** 

*what*: extensive search across many sources in many languages

why: prepare detailled reports

how: own knowledge/language skills

*needs*: access of multilingual souces ok with automatic translation

Translators (BBC World)

what: monitor world-wide news

why: translate into English

*how*: listen to news channels polyglots (up to 7 languages)

needs: retrieve news reports

Parlament Librarians (Finland) what: retrieve laws / reports

why: provide a service to MPs

*how*: own/others language skills search strategies (e.g.code)

needs: automatic translation - NO!





### Comparative evaluation: translation check vs. translate-search

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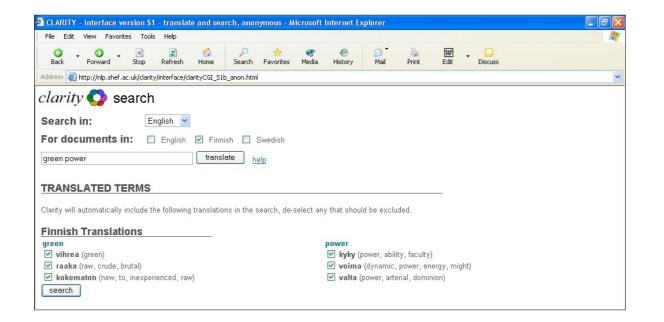
# green(s)

## power

- 1. colour
- 2. grass
- 3. vegetables
- 4. unexperienced
- 5. party
- 6. golf course
- 7. not harmful to the environment
- 8. ... up to 13 different meanings

- 1. ability
- 2. authority
- 3. strength
- 4. influential
- 5. supernatural
- 6. performance
- 7. energy
- 8. ... + maths





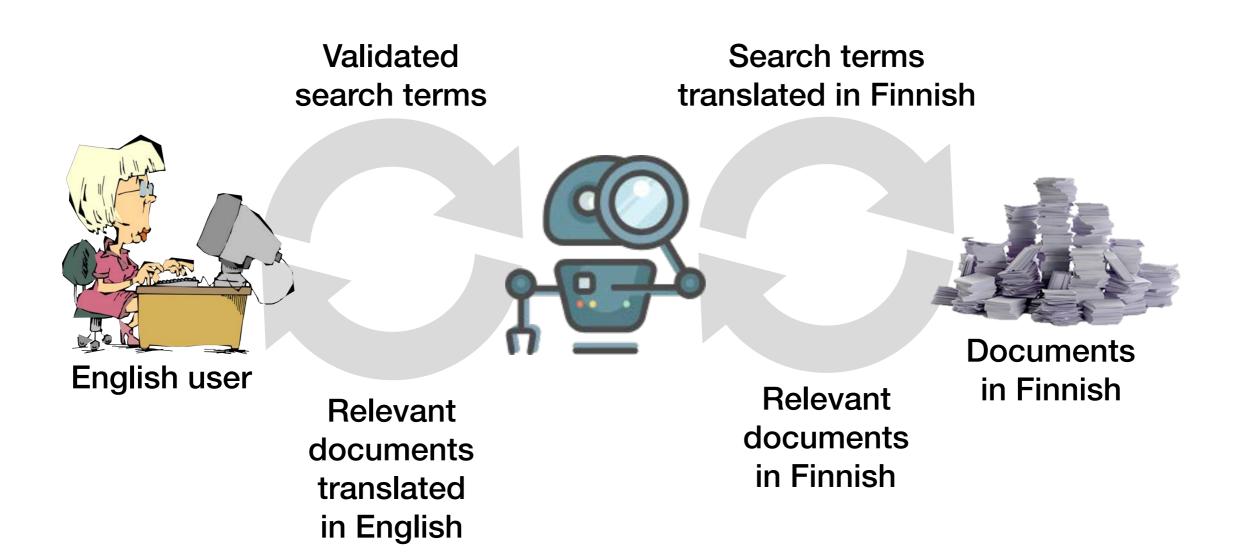
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Petrelli, D., et al. (2004) *Observing Users – Designing Clarity: A Case study on the user-centred design of a cross-language retrieval system.* JASIST. 55(10), 923-934. Petrelli, D. et al. (2006) *Which User Interaction for Cross-Language Information Retrieval? Design Issues and Reflections.* JASIST. 57(5), 709-722.



# Cross-language Information Retrieval option 1: check translation, then search







# Cross-language Information Retrieval option 2: translate & search



English user





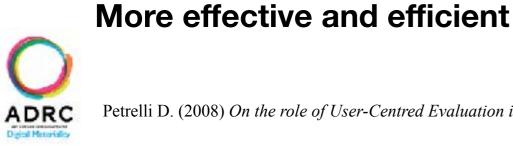




## Comparative usability test: translation check vs translate&search

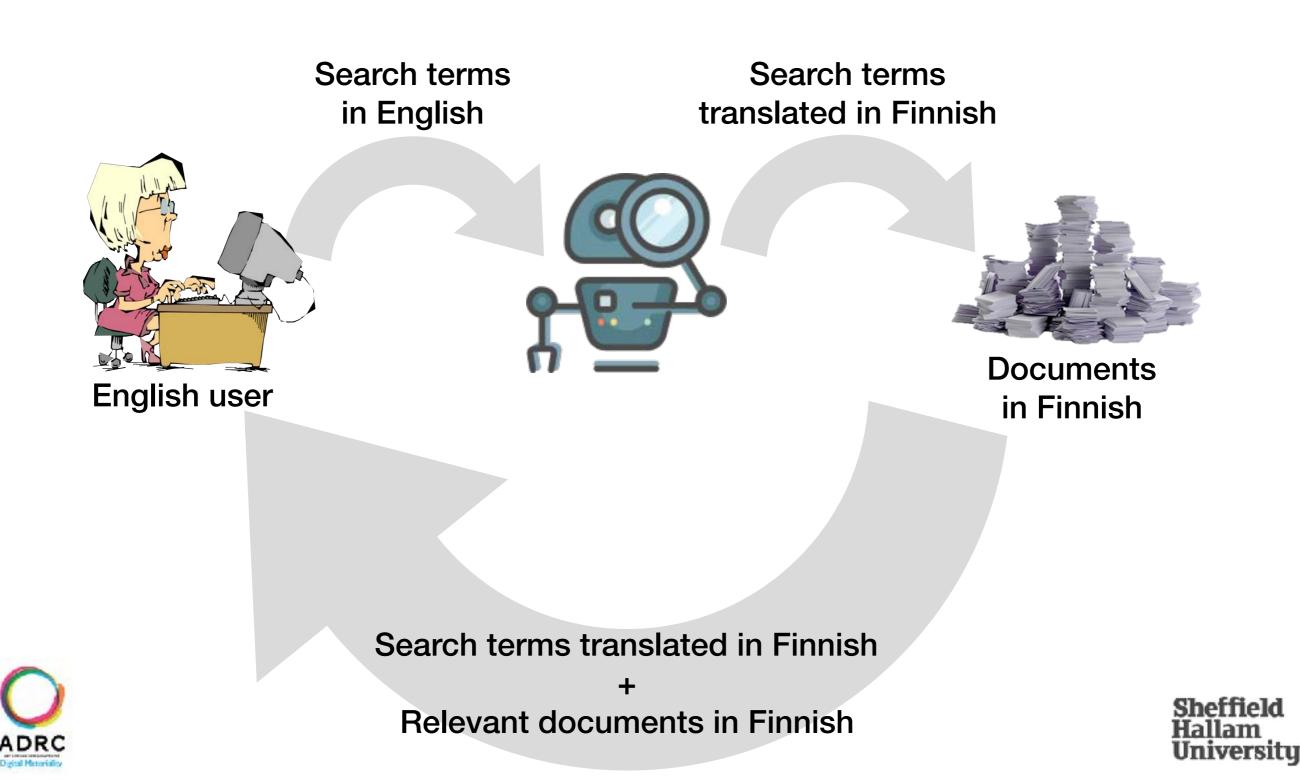
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ill automatically include the following translations in the search, de-select any that should be excluded.	Terms found: geneettinen, sairaus (genetic, disease)	genede disease.
sh Translations	vaa eli ennenaikaisesti tylsistynyttä ihmistä. Heistä puolella sairaus johtuu alzheimerintaudista. Dementia on lähes poikkeuksetta yli 65-vuotiaiden ihmisten sairaus Olisi hyvä, jos sairaus v	Tampereella tutkitaan
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ISH RESULTS BOOKMARKS		
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saranassa, un seuraara maan namuus miinkanakumen tanansa. Tanan asu riineat ords kmark	nen geenitausta Muutaman vuosikymmenen aikana ihmiskunnan perintöaines ei kuitenkaan voi muuttua. Nyt geeniteknologian kehittymisen ja sairauden lisääntymisen myötä astman perinnöllisyys ja genee	
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### Preferred by users (user satisfaction)





### **Cross-language Information Retrieval**



Clarity - interface - S1.9 - Microsoft Internet Explorer		×
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<i>clarity</i> 🜍 search		^
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For documents in:	Latvian	
prison sentences drug dealing search help		
Non-UK keyboard characters: ä, Ä, ä, Ä, ë, Ë, ï, Ï, ö, Ö, ø, Ø, Ü, Ü		
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Finnish Translations		
prison sentences drug	dealing	
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verdict)		
🗹 tuomita (condemn, denounce,	Jako (division, deal, partition)	
adjudicate)		
update		
list summaries overview		
Displaying results 1-10 for query prison sentences drug dealing		
FINNISH RESULTS	BOOKMARKS	
1. Huumenuorelle kaksi vuotta vankeutta Hämeenlinnassa		
Huumenuorelle kaksi (two) vuotta (year) vankeutta (captivity) Hämeenlinnassa		
Terms found: huume, tuomita, käydä, vankila, tuomio (drug, sentences, dealing, prison,	refresh clear print save	
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lisätuomion.Nuorukainen on käyttänyt huumeita jatkuvasti kahden vuoden aikana, vankilassakin. Siellä		
hän velkaantui 58 words		
bookmark		
2. Ratsiamylly pitää huumeet loitolla Kylmäkoskelta		
Ratsiamylly pitää (give) huumeet (narcotic) loitolla Kylmäkoskelta		
Terms found: huume, vankila, käydä, jako, kauppa, tuomio, tuomita (drug, prison, dealing,		
dealing, dealing, sentences, sentences) keskusvankilaa, nuorisovankila, yhdeksän lääninvankilaa, Vilppulan ja Kestilän varavankilat sekä Sukevan		
kurssikeskus. Avolaitoksina toimii kolme varavankilaa, seitsemän avovankiosastoa ja kymmenen		
703 words bookmark		
3. Ankarat tuomiot huumekuriireille		
Ankarat (severe) tuomiot (judg) huumekuriireille Terms found: tuomio, huume, tuomita, kauppa, vankila (sentences, drug, sentences, dealing,		
prison)		
tuomiot huumekuriireille Yhdeksän kiloa heroiinia Thaimaasta Suomeen salakuljettanut pariskunta tuomittiin torstaina Vantaan käräjäoikeudessa vankeuteen törkeästä		
390 words		14
bookmark	🌍 Internet	



Petrelli D. (2008) On the role of User-Centred Evaluation in the Advancement of Interactive Information Retrieval. IPM, 44 (1), January 2008, 22-38.

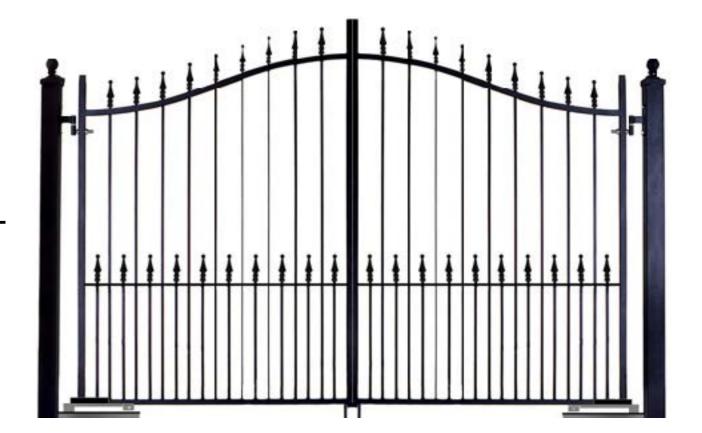














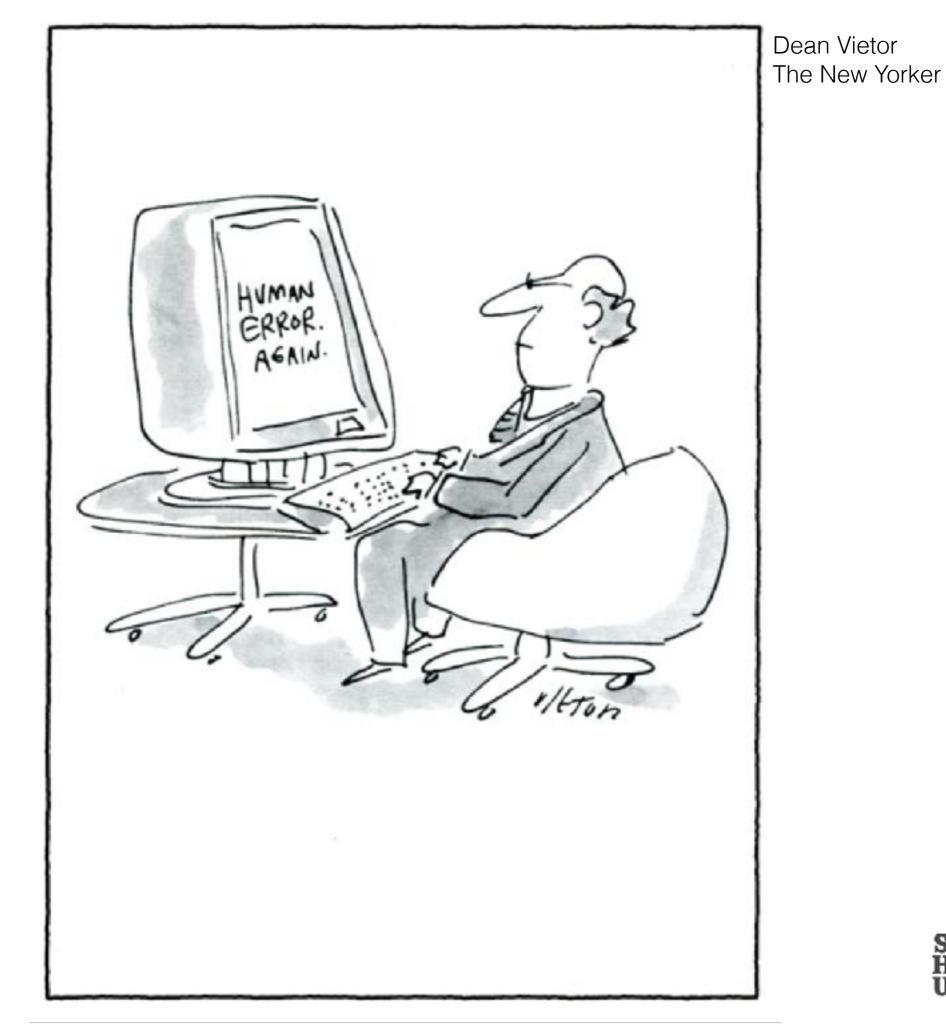


### \*Bill Gates\*

write \* ... \* to bypass the translation















Sheffield Hallam University







### signora vestito bianco











St Andrew University - special collection

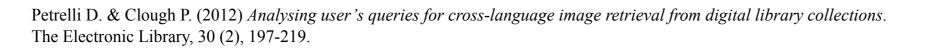


translated query: Mrs. dressed white man



	Success					
Topic	(%)	Users	Average number of queries	Average number of terms		
1	75	6	3.9	6.5		
2	62.5	5	3.1	7.1		
3	62.5	5	5.1	7.4		
4	100	8	1.1	4.2		
4 5 6	12.5	1	7.5	7.9		
6	87.5	7	2.6	4.7		
7	12.5	1	7.1	9.2		
8	75	6	4	6.2		
9	100	8	1.6	4.9		
10	12.5	1	7	10.2		
11	62.5	5	5.6	8.9		
12	100	8	4.5	8.4		
13	37.5	3	5.1	8		
14	100	8	1	4		
15	62.5	5	3.2	5.5		
16	62.5	5	4.2	8.2		









Add to Selection

ID: JV-R-5508 Title: Setting Drag Nets, Lough Neagh. **Other Title:** Lough Neagh, Northern Ireland. Setting Drag Nets. Place/Location: World, Europe, Northern Ireland Creation Date: 1958 Created By: J Valentine & Sons Available Format + Media: photographic prints / gelatin silver prints Subject Index: fishing equipment (145) fishermen (144) rowing (749) harbours (962) rowing boats (741)

#### **Cataloguing Details**

#### **Description:**

Clinker built rowing boat, with two fishermen, one casting nets and the other rowing; low harbour wall with slipway.







#### Add to Selection

ID: GMC-7-11-10 Title: Joe Conrad (USA) in practice. Other Title: The Open Championship, St Andrews 1955. Joe Conrad (USA) driving, in practice. Place/Location: [7009562] World, Europe, United Kingdom, Scotland, Fife, St Andrews (56 20 0 N, 2 47 0 W) Creation Date: 1955 Created By: Cowie, George, Middlemass, (1902 - 1982), St Andrews, Scotland Available Format + Media: negatives (photographs) / gelatin dry plate negativ Subject Index: clubhouses (341) dress - sports and leisure wear (987) golf - British Open (2091)

golf - general (1549)

#### **Cataloguing Details**

#### Description:

Golfer with raised club following course of ball watched by other players and spectators in front of R&A Clubhouse.







### Add to Selection

ID: JBM-33-2-25 Title: Montu's Temple, Nag-el-Medamoud. **Other Title:** Nag-el-Medamoud. Temple of Montu. Place/Location: World, Africa, Egypt **Creation Date:** 1992 **Created By:** Milne, Mr, James, Burt, (1918 - 1997) Available Format + Media: positives (photographs) / slides (photographs) Subject Index: buildings - stone (8220) temples (305) Egyptian ruins (208)

#### **Cataloguing Details**



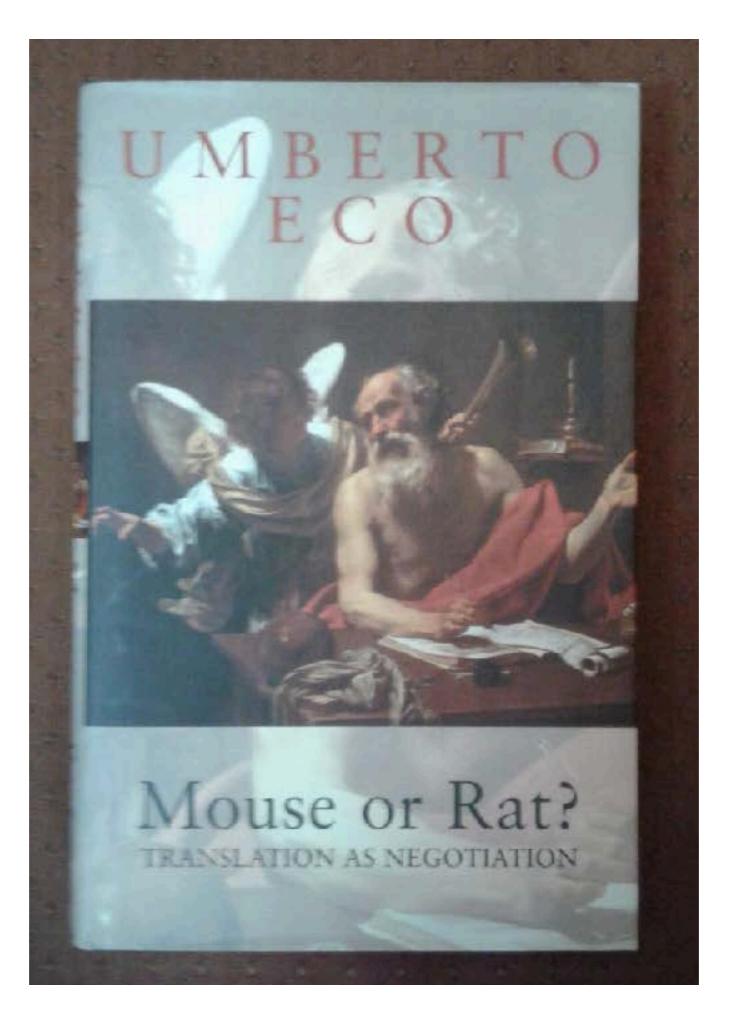


## Designing the linguistic interaction

- users do not use well formed queries and machine translation fails (but bilingual dictionaries fail in dealing with bi-grams, e.g. adjective + noun)
- 2. users pick up terms displayed by the system in follow-up queries, both correct translations and ill-translated terms
- 3. all metadata should be indexed as they can be the key to succesful retrieval, e.g. location
- 4. users search for what is prominent in the image but describing the background improved the retrieval for a subset of images
- 5. archival metadata is key and extra fields such as foregraound and background descriptions could improve performance











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