I think we need to talk about
tone of voice
and I know we need to talk about
design

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design for conversation

Vodafone Simply by IDEO

**from design ethnography
to product launch**

**Spyfish STV
(H2Eye + IDEO)**

Remote controlled submarine, just part of *Spyfish STV*
(Submarine Telepresence Vehicle) system

but the interface
is the product

Hand controller and screen with live video and information graphics

**interaction design
combines thinking
and crafting**

Detail from *spyFish*

design for conversation

Table Talk by IDEO, exhibited at the V&A Museum, London
as part of HearWear exhibition, curated by the RNID and Blueprint

Tim Brown

Chief Executive Officer, IDEO, USA

BA in Industrial Design, University of Northumbria; Master's in Design, Royal College o
Steelcase, Procter and Gamble, Pepsi. With IDEO: 1992-95, Manager, San Francisco o
Visiting Professor, University of Northumbria. Council Member: External Advisory Cou
America; Art Directors' Club, UK. Expertise: industrial design, interaction design. Intere

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design transcends objects

IDEO CEO, Tim Brown, attends World Economic Forum

design meets disability

expression meets information

Richard and Thomas Ellenson with *Tango!*

differences between speaker and listener.

But they are also intrigued by ambiguity and the room left for interpretation. They cite French information theoretician Abraham Moles' theory that aesthetic pleasure is determined by the balance of the originality of the message and the ability of the recipient to understand it.[15] Clearly intonation plays a role on both sides of this equation: it helps decipher meaning but, as importantly, it affords more originality of expression. At the moment it seems that AAC is more concerned with understanding than expression.

The *Dictionary of Primal Behaviour* is described as an art project and not only is aesthetic pleasure a theme of the research, it is also manifest in its presentation. If this level of design were routinely brought to AAC, devices would be more satisfying to use but also send out more positive signals about their users to others. Too often communication aids designed for adults look as though they are intended either for young children or for computer programmers, and perhaps even designed by young children or computer programmers. In our culture we take for granted a visual sophistication in most things, from newspapers to book covers to websites to packaging. How much more appropriate to find this in something as profound as a communication aid?

Tango!

Richard Ellenson is an advertising executive whose son, Thomas, has cerebral palsy. When Ellenson founded the company Blink Twice[16] to create a product to help young children to communicate, he did not attempt to design everything himself or even to build a company that would design everything itself. He approached it as he might have any major campaign: by seeking out a diverse cast of world-class specialists to each bring what they did best. So he engaged not only the speech language professionals Pati King-DeBaun, Patrick Brune and Beth Dinneen, but also

Somiya wearing the badge she designed with Johanna Van Daalen.

companies with no prior involvement in AAC: product design groups Smart Design and frog design, who brought the same sensibilities as they would to a product for able-bodied kids, whilst electronics manufacturing company Flextronics brought consumer-market technology and build quality. Ellenson even involved the kids' television network Nickelodeon, to develop cartoon characters and voices for the interface, whereas the graphical user interfaces on most AAC devices have never even involved a graphic designer. "The sensibility that has infiltrated the toothbrush section of Target has not yet reached assistive technology and there is no world where first impressions are more important" says Ellenson.[17] Whatever our opinions of the excesses of toothbrush marketing, this is an incontrovertible yet chilling observation.

Tango!, the resulting product, has been compared to an overgrown Sony *PSP (PlayStation Portable)*, an appropriate and positive association given its target market and their peer group. This attention to aesthetics is not just applied to the surface, but from the inside out, from the fundamentals of the user interface itself. Even the choice of voice qualities is tuned to a child's need to express themselves in particular ways, between speaking, yelling, whispering and whining. *Tango!* has set a new standard not just in AAC or assistive technology but in design for disability in general.

you cannot not communicate

"You cannot not communicate" is a much-repeated statement attributed to Erik Spiekermann, founder of graphic design group MetaDesign. Whether or not graphics are consciously designed, they will inevitably express strong messages to different people, positive or negative. There is no such thing as a culturally *neutral* design language, and this applies equally to other modes of communication: a lack of intonation speaks volumes.

When Somiya uses her badge.

Communication aids are not a neutral technology or a transparent medium. Alongside the messages they transmit, they inevitably send out other signals themselves. Their physical design, their interactions, their voice qualities and their intonation or lack of it all communicate something too. How important for these signals to have been considered as part of the design process and for the person using the device to be supported by these layers of communication, not undermined by them.

Somiya has the last word

Design for communication can be both simple and profound.

Somiya uses a dialogue book in order to communicate with other people, in which she points to words or images. This is versatile, but can be laborious. When Somiya was still at school, Johanna Van Daalen from design group Electricwig worked with her to help her to express herself more fully. In particular, Somiya wanted the freedom to express frustration more spontaneously, so together they designed a badge that she could activate using a switch next to her head, whenever she wanted to.

When she does this, the badge lights up with the words *Somiya says "SOD OFF"*.

This message is wonderfully direct and disarming, and yet the badge expresses so much more besides this information. It also communicates that she is the kind of person who will use this language; that she is the kind of person to whom this is important enough to dedicate a button to; that she doesn't mind who knows this. Perhaps it seems inefficient to produce such a limited communication device, one that can only be used for one sentence. But this is to ignore its other role: the short-term utterance is also a long-term badge - a label of Somiya's own devising, to express her individuality and her identity, rather than any stereotype associated with her impairment.

Six Speaking Chairs

15. It is advantageous to show the stress on the intonation-ph. This is conveniently done by showing stressed syllables large dots. If a syllable with a rising or falling intonation is ed, this may be shown by placing a large dot on the appro-iate part of the curve (generally at the beginning); so when a curve has no dot attached to it, it is to be understood that the syllable is unstressed.[3]

1016. Intonation is most important for indicating shades of meaning. Compare the following:

(meaning 'That is so')

jes.
Yes.

(meaning 'Of course it is so')

jes.
Yes.

(meaning 'yes, I understand that; please continue.' This form is very frequently used when speaking on the telephone. The same intonation would be used in answering a question if a further question were expected; for instance a shopman would ... it in answering the question 'Do you keep so and ...

jes.
Yes.

(meaning 'Is it really so?')

jes?
Yes?

jes.
Yes.

(ordinary ...)

'wot ə ju:
What are you

Shades of meaning of "yes" from the fifth edition of *An Outline of English Phonetics* by Daniel Jones, published in 1936 by W H Heffer.

choice of words and punctuation."[2]

So improving the expressiveness of communication aids may demand thinking about interacting with synthesized speech in a totally different way, not just advancing the underlying technology. Professor Alan Newell has been pioneering AAC research at the University of Dundee for 25 years and considers that the field has settled into rather conservative ways of approaching communication devices. As early as 1991 he was advocating a "paradigm shift"[3] in thinking about AAC: a shift that is yet to take place. Interaction designers could make a valuable contribution, complementing the Human Computer Interface (HCI) specialists already in the field by bringing a design culture, design sensibilities and design skills to our interactions with technology and communication with each other. Designing any communication aid is about designing interactions.[4]

playing with speech

One example of a radical new interaction with synthesized speech can be found in the *Social Mobiles* project, the extreme telephones that reduced anti-social behavior. The second phone in the series, the *Speaking Mobile*, didn't deter people from using their phone, but allowed them to speak with their hands, in circumstances where it would be inconsiderate to talk out loud. This inhibition could almost be viewed as a socially-contextual speech impairment.

If TTS offers a full vocabulary but little or no control of intonation, the *Speaking Mobile* is all intonation, at the expense of vocabulary. In fact the user can say only "Yeah" or "No", but can intone these any way they want to by manipulating their timing and pitch with a joystick. With practice, it is possible to produce all of the variants described by Crystal and more.

Can anything be learnt from this extreme approach, that might have relevance to communication aids?[5] In accordance

happy / sad chair

emotion

*exclaiming / questioning
chair*

linguistics

*aac:
state-of-the-art*

phonetics

rising / falling chair

psychology

paralinguistics

ecological psychology

musical expression

*reassuring /
undermining chair*

speech acts

stage directions

*deferential /
domineering
chair*

terse / whispering chair
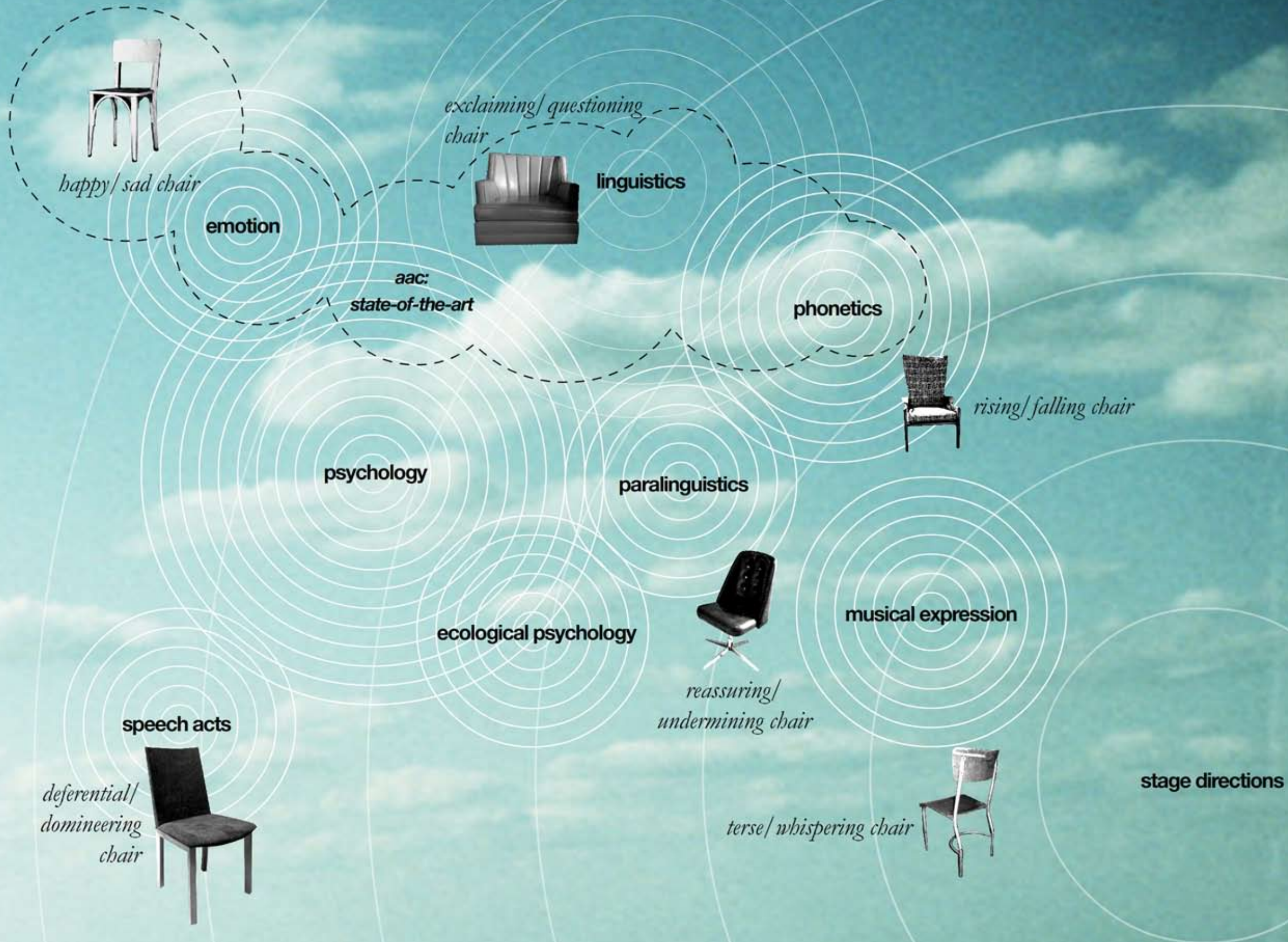
Six Speaking Chairs by Pullin and Cook

exclaim   say   question

"Hello" "No" "Really"

Otherwise "Yes"

exclaim   say   question

Higher voice

Deeper voice

y——e——s

Please practice

Appreciatively Brusquely ...Coaxing Coyly Explosively Protesting

Roaring Reflectively Suspiciously Sweetly Tempted Tickled

Terse Unabashed Uneasy Whimpering Whispering

Please customise

easy whimpering Whispering

Please customise

17 ways to say yes

please customise

Chair No.6 *The Terse/Whispering Chair*

1 questioning
2 definite
3 Sarcastic
4 tentative
5 enthusiastic
6 supportive
7 embarrassed
8 thoughtful
9 defensive
10 neutral
11 encouraging
12 probing
13 empathic
14 brisk
15 non committal
16 irritated
17 agreeing

your 17 ways

timid / shy
sexy
angry
elated
bored
sad
unbelieving
drunk
accepting
accusing
anticipating
slyly
frightened
controlling - in power
formal
schoolyard slang

40+ respondents

PETTYNYT (DISSAPOINTED) YES

HÄMMÄSTYNYT (SUPPRISED) YES

VIHAINEN (ANGRY) YES

UJO (SHY) YES

PELOKAS (AFRAID) YES

HYÖKKÄÄVÄ (AGRESSIVE) YES

LÄMMIN (WARMLY) YES

KOVA (HARD) YES

IHASTUNUT (ENTUSIASTIC) YES

~~XXXXX~~ RUMA (UGLY) YES

RAKASTUNUT (LOVING) YES

KASVAVA } (DEVELOPING) YES
KEHITTYVÄ }

UTELIAS (CURIOUS) YES

500+ tones of voice

c	sarcasm	sarcastic x 10	sarcastically x 8		221	19
c	question x 2	question-ly	questioning x 10	questioningly x 5		18
c	enthusiastic x 8	enthusiastically x 4				12
c	surprise x 3	surprised x 9				12
c	uncertain x 6	uncertainly x 2	uncertainty x 2			10
c	encouragement	encouraging x 2	encouragingly x 5			8
c	definite x 3	definitely x 2				5
c	assertive x 3	assertively				4
c	dismissive x 3	dismissively				4
c	thoughtful x 2	thoughtfully x 2				4
c	agreeing	agreement x 2				3
c	doubtful x 2	doubtfully				3
c	firmly x 3					3
c	impatiently x 3					3
c	seductively x 3					3
c	tentative x 2	tentatively				3
c	acknowledging	acknowledgement				2
c	amused x 2					2
c	appreciatively x 2					2
c	curious x 2	curiously				2
c	defensive x 2					2
c	determined	determinedly				2
c	disagreement x 2					2
c	disbelief	disbelievingly				2
c	doggedly x 2					2
c	forceful	forcefully				2
c	non-commital	noncommittal				2
c	pleading	pleadingly				2
c	request	requesting				2
c	resigned	resignedly				2
c	sceptical	skeptical				2
c	slyly x 2					2
c	unbelieving x 2					2
c	unconvinced x 2					2
c	unsure	unsure doubtful				2
c	absolutely					1
c	accepting					1
c	accusing					1
c	affirmative					1
c	agreeable					1
c	ah-ha-discovery					1
c	anticipating					1
c	automatically					1
c	coaxingly					1
c	complaining					1
c	conclusive/ determined					1
c	confirmation					1

250+ distinct tones of voice

speaker's **emotional** state

vocal qualities

conversational intent or effect

social and relational context

4 points of view
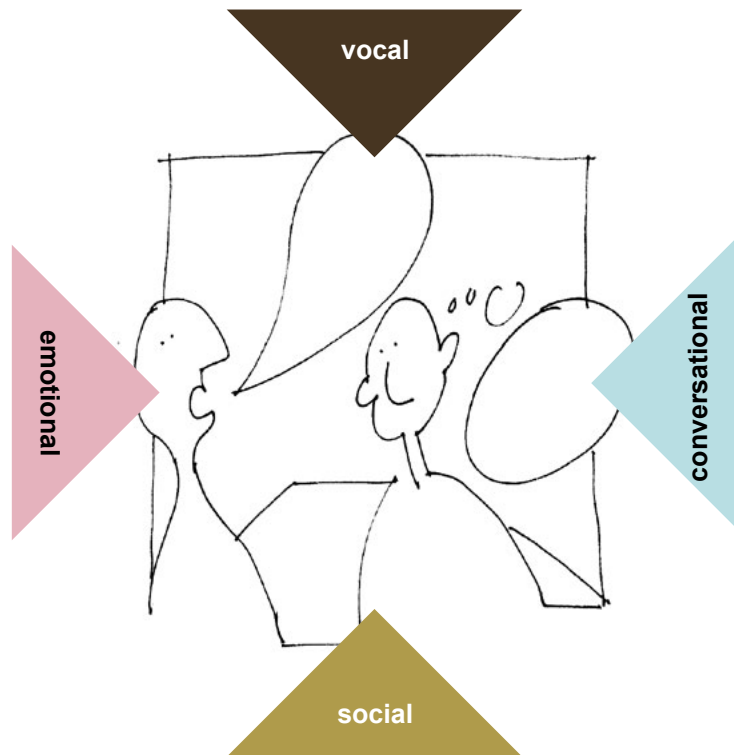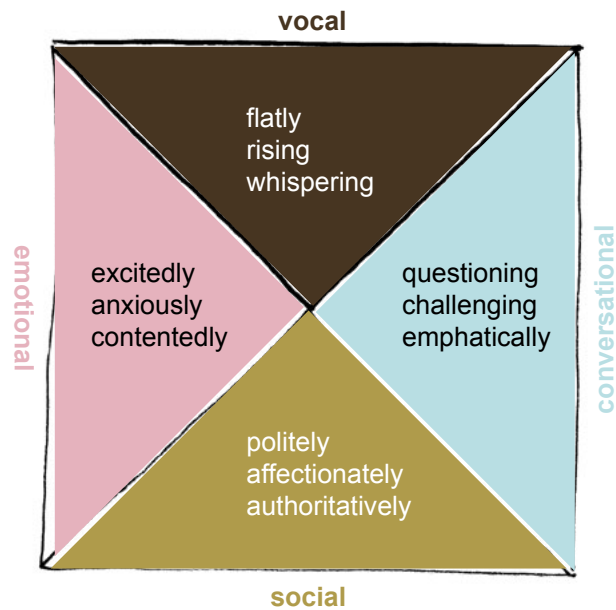on tone of voice

speaker's **emotional** state

vocal qualities

conversational intent or effect

social and relational context

**4 points of view
on tone of voice**

vocal

flatly
rising
whispering

excitedly
anxiously
contentedly

questioning
challenging
emphatically

emotional

conversational

politely
affectionately
authoritatively

social

mapping 250 tones of voice

vocal

hesitantly
laughing
whispering
hurriedly
quickly
quietly
robotically
shouting
silently
soft
terse/ short
yell

breathily
brisk
crying/ tearfully
drawn out
dysfluently
emphasis Y-E-S (spelt out)
gently
hard
hesitant (very)
Jersey accent
John Wayne (like)
Marilyn Monroe (like)
mon(o)tonically

musically
peacefully
repeatedly
singing
slury
southern drawl (USA) (with a)
Tiggerish
whining
with extreme effort
wondering - hmmm… yes
yelling (not angry)

emotional

angrily
sadly
happily
excitedly
boredly
afraid
tired
annoyed
cheerfully
frustrated
grumpily
tense
upset
aggressive
confused
disappointed
disgust
disinterested
dreamily
drunk
suspiciously
worried
absentmindedly
angry - begrudgingly
apathetic
apprehensive
cautiously
coldly
distracted
don't care
drowsy
eager
ecstatic
elated
exasperated
exhausted
fiercely
hungrily
irate

joyous
listless
melancholic
moodily
mournful
oh goody/ with glee
pensively
perplexed
relief (with)
screaming (anger)
sleepily
smile in the voice
snappily
surprised (negative)
surprised (positive)
tearful
uninterested
wistfully

conversational

profoundly
prompting
provocatively
questioning (dizzy)
reflecting
reluctantly
solved the problem!
spontan(e)ity
suggesting
suggestively
teasing
thankfully
thrillingly
unabashedly
unassuredly
unequivocally
uptalking
urgent
whimsical

defeated
demanding
desperately
developing
disagreeable
disapproving
don't believe you
dramatic
dry
evasive
eureka–got it!
exclamation
exhilaratingly
expectantly
genuinely
grateful (yes thankyou)
hopeful
imperative
impressed
insisting
interested
intrigued
invitingly
ironically
jokingly
laughingly, jokingly
light-hearted
matter of fact
maybe (=)
moaning
mysteriously
negative
negative (very)
plaintive
positive
positive (very)
probing

sarcastically
questioningly
enthusiastically
surprised
uncertainly
encouragingly
definitely
assertively
dismissively
thoughtfully
agreeing
doubtfully
firmly
impatiently
seductively
tentatively
acknowledging
amused
appreciatively
curiously
defensively
determinedly
disagreeing
disbelievinglyly
doggedly
forcefully
non-commitally
pleading
requesting
resignedly
sceptically
slyly
unbelievingly
unconvinced
unsure
absolutely
accepting
accusing
affirmative
agreeable
ah-ha-discovery
anticipating
automatically
coaxingly
complaining
conclusive/ determined
confirmation
consideringly

social

shyly
empathetically
embarrassed
supportively
sweetly
authoritatively
consolingly
defiantly
irritatedly
lovingly
playfully
self-deprecatingly
sexily
sympathetically
timidly/shyly

British dialect
business-like (short)
cheekily
confidential
confidently
congenially (I'm with you)
controlling - in power
dominating
erotically
expertly
flattering
flexibly
flirtily
formal
friendly
haughtily

humbly
informal
intellectually
kind
kind/ concerned
meekly
offhand
overpowering
passionately
patronizing
professionally
reverently
schoolyard slang
serious
sexually
smartly
snippy

ISAAC 2008 No. 1	ISAAC 2008 No. 2	ISAAC 2008 No. 3	ISAAC 2008 No. 4	ISAAC 2008 No. 5
acknowledging	timid/ shy	affirmative	shyly	encouragingly
breathily	sexy	hesitating	laughingly	suggestively
quietly	angry	surprised	crying/ tearfully	mysteriously
definitely	elated	enthusiastic	dreamily	ah-ha-discove
unsure	bored	curious	erotically	oh goody/ wit
laughingly	sad	questioning	sexually	uncertainty ye
questioningly	unbelieving	tired	playfully	congenially (I'
sadly	drunk	annoyed	tiredly	warmly (I like)
quickly	accepting	expectantly	drawn out	coldly (it's tru
meekly	accusing	thoughtfully	hungrily	serious
angrily	anticipating	conclusive/ determine	doggedly	playful
consideringly	slyly	angrily	standof(f)ishly	cheerfully
	frightened	shouting	hurriedly	self depra(e)c
	controlling - in power	sad	musically	excited
	formal	happy	grumpily	definite
	schoolyard slang	hurried	repeatedly	grateful (yes t
		whispering	silently	wistfully

mapping 250 tones of voice

vocal	16 on this sheet	20%
conversational	25 on this sheet	32%
social	16 on this sheet	20%
emotional	22 on this sheet	28%
	79 coloured in	100%

six dilemmas

much more choice?...   ... yet quick enough in use?

points of view on tone of voice?...   ... yet coherent?

personal and flexible?...   ... yet intuitive?

more nuanced?...   ... yet feasible?

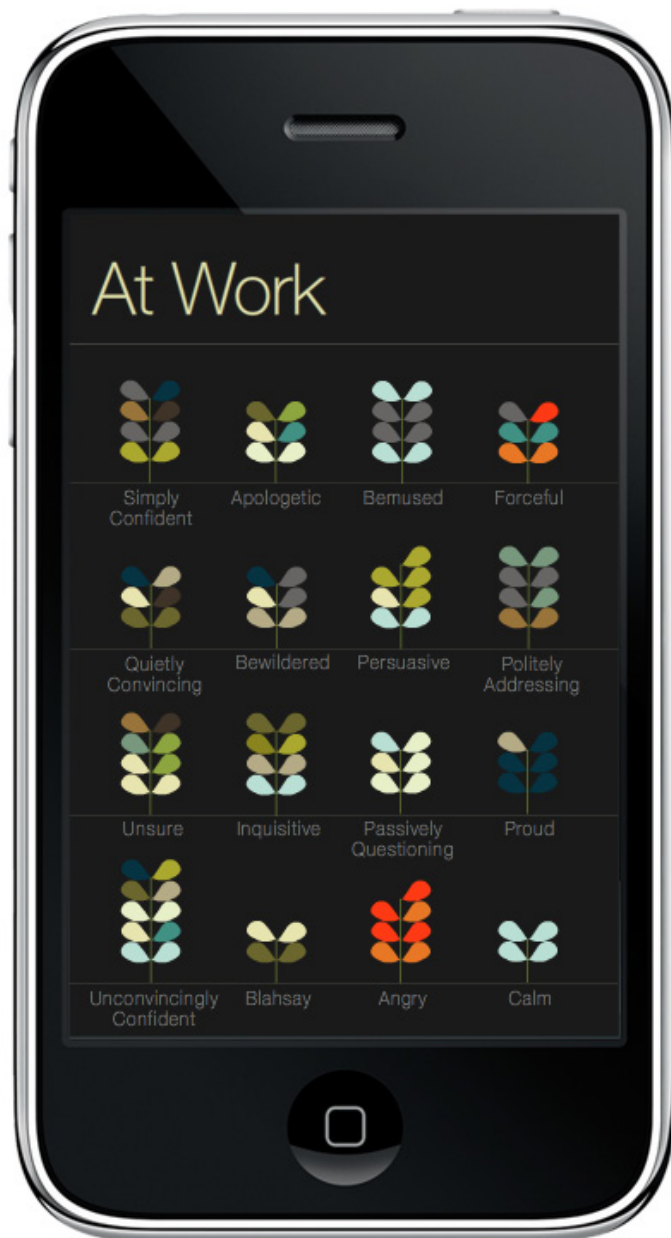more expressive?...   ... yet engaging?

more sophisticated?...   ... but in whose terms?

Speech Hedge

Speech Hedge

an illustration

At Work

Simply Confident | Apologetic | Bemused | Forceful

Quietly Convincing | Bewildered | Persuasive | Politely Addressing

Unsure | Inquisitive | Passively Questioning | Proud

Unconvincingly Confident | Blahsay | Angry | Calm
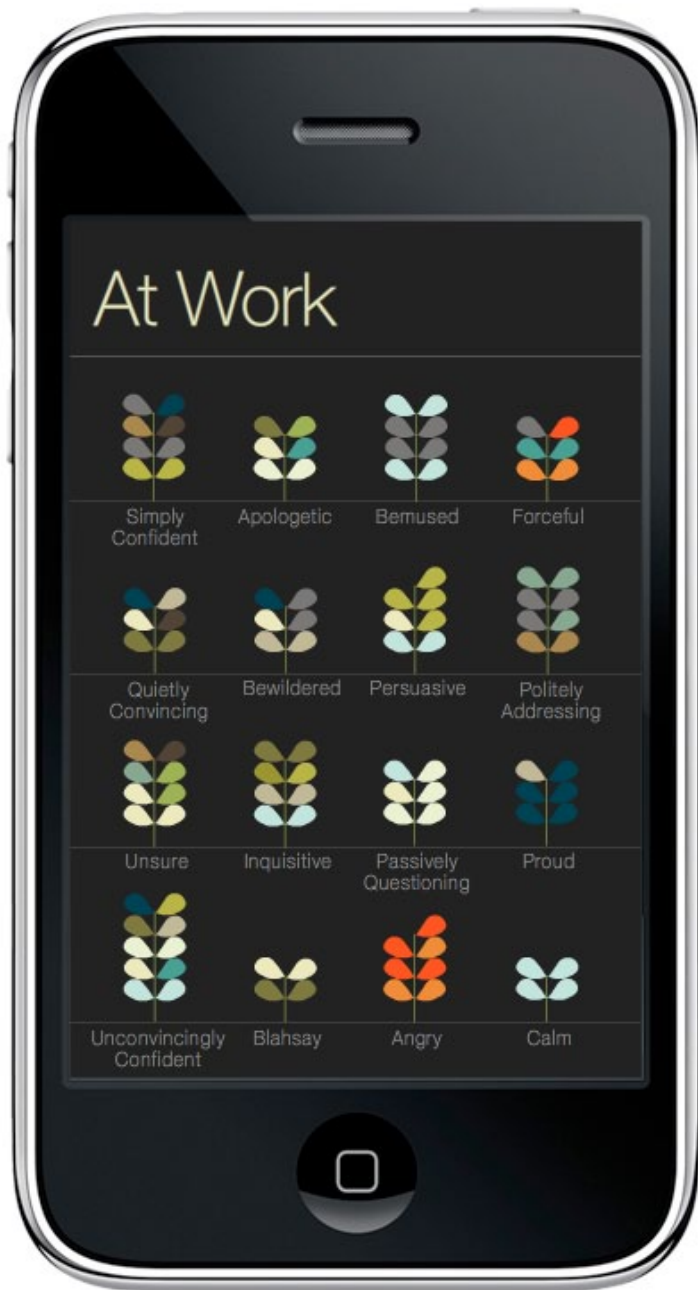
hedges lend structure
and constrain choice

At Work

Simply Confident	Apologetic	Bemused	Forceful
Quietly Convincing	Bewildered	Persuasive	Politely Addressing
Unsure	Inquisitive	Passively Questioning	Proud
Unconvincingly Confident	Blahsay	Angry	Calm

Apologetic

My Hedges

At Work

In the Pub

With Jenny

Basic
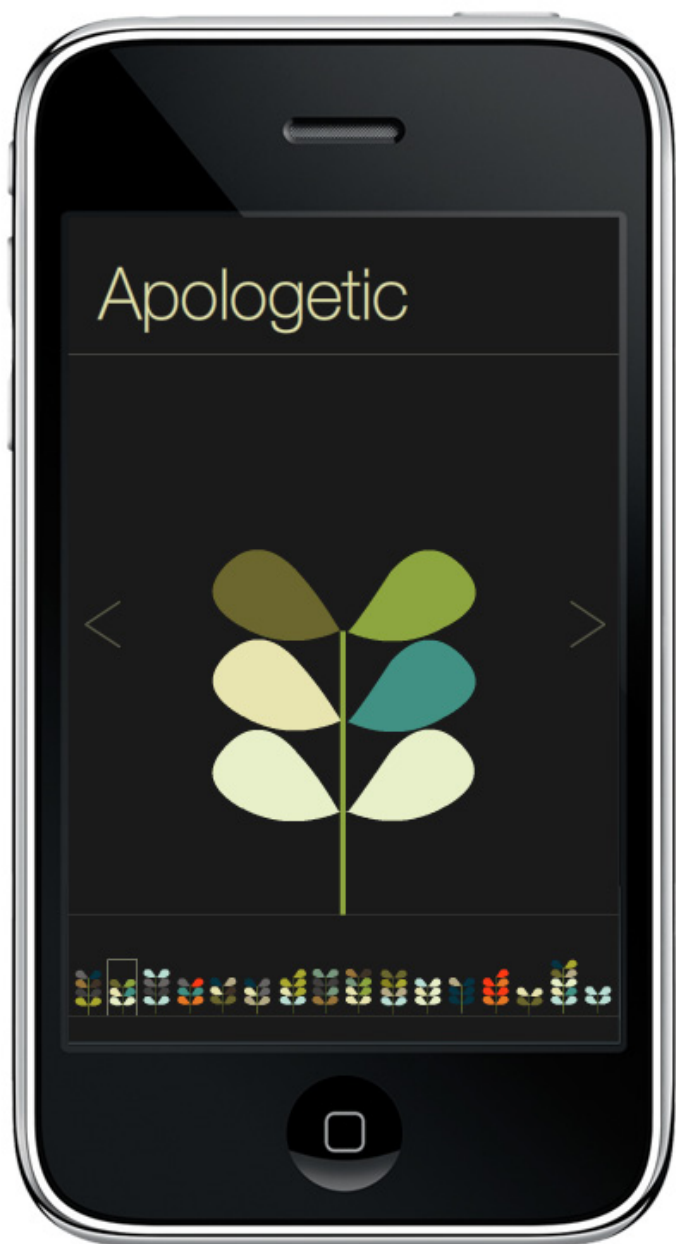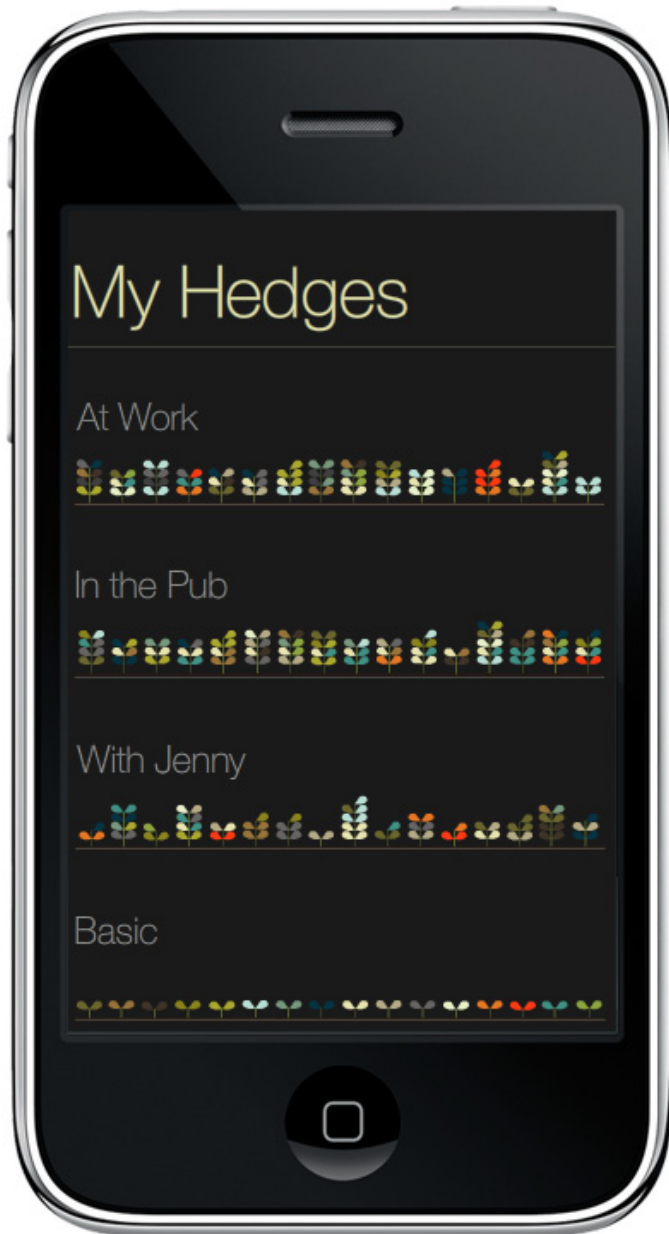
much more choice...
... yet quick enough in use

much more choice...   two user interfaces
... yet quick enough in use
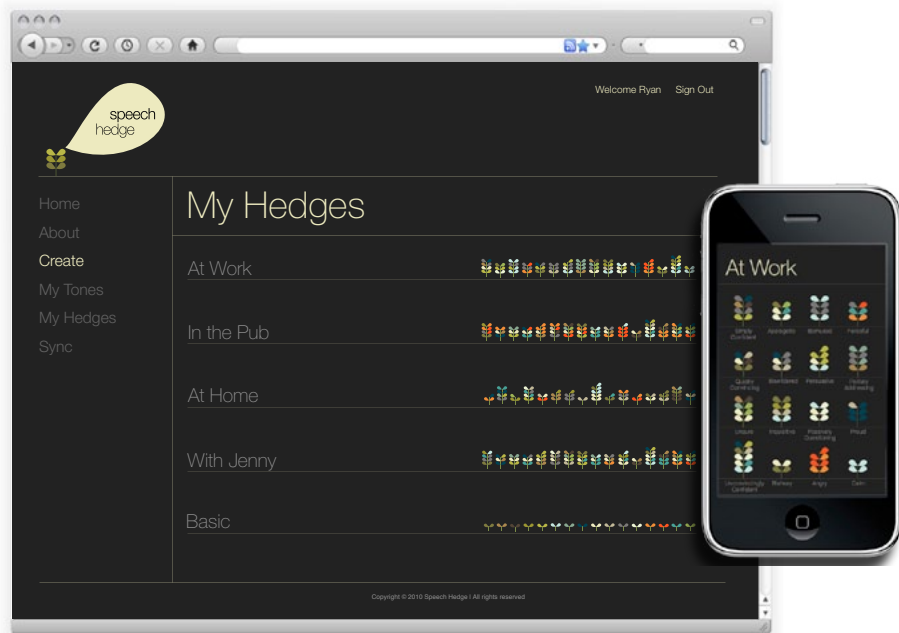
two user interfaces

Iphone interface in use

PC interface in preparation

more nuanced...
... yet feasible

more nuanced...

... yet feasible

tones described subjectively
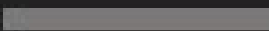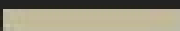
after crafting

We thought you

Quietly Convincing
Created by Ryan McLeod 30.03.10

"For speaking to colleagues at work"

Formally	▬▬▬▬▬	37.5%
Bored	▬▬▬	25%
Warmly	▬▬▬	25%
Questioning	▬▬	12.5%

tones described subjectively
after crafting

Ryan created this tone, and then labelled it

more sophisticated...
... but on whose terms?

more sophisticated...
... but on whose terms?

support
the emergence
of sub-cultures

support
the emergence
of sub-cultures

Adobe *Kuler* supports creation and peer review

**creative
social network
for sharing**

because crafting tones of voice might appeal to other people

than just users of tones of voice

Leg splint for the U.S. Navy designed in 1942 by Charles and Ray Eames
and manufactured by the Evans Products Company.

good design on any terms

I eventually tracked down this iconic object in San Francisco, having long admired the contrast between its organic form and geometric holes, the combination of subtle surfaces and crisp edges. I am not describing a sculpture by Barbara Hepworth, but a mass-produced product by Charles and Ray Eames. It is not even a piece of domestic furniture, but a leg splint they designed for injured and disabled servicemen in the US Navy.

The splint is made of plywood that has been formed into complex curves. Its design language was radical in 1942 and is still inspiring today. It appeals to me not because of its medical purpose, but as good design on any terms. How many other examples of design for disability might that be said of? How often do we qualify, even excuse, design in this field because of the market for which it is intended? Perhaps this standard of *design* is not even considered appropriate?

DCW (Dining Chair Wood) chair designed by Charles and Ray Eames in
1945 and manufactured by Herman Miller.

disability inspires design

Charles Eames believed that "design depends largely on constraints".[1] It was the particular constraints of the US Navy brief that led the Eames to develop their own technology for forming plywood in complex curvature in the first place, in order to make a lightweight but stiff structure that accommodated the form and variation of the human body. But this technique had a far-reaching influence on the future work of the design partnership and on design in general.

Organic plywood forms underpinned the iconic mainstream furniture manufactured by Herman Miller in the 1940s and '50s, through which the Eames became famous and influential. This sequence of events challenges the so-called *trickle down* effect, whereby advances in mainstream design are expected to eventually find their way into specialist products for people with disabilities, smaller markets which could not have supported the cost of their development. Flow in the opposite direction is just as interesting: when the issues around disability catalyze new design thinking and influence a broader design culture in return.

An original leg splint alongside a sculpture by Ray Eames.

nurturing healthy tensions

The journey from leg splints to mainstream furniture was not a direct path. Ray Eames began by making (actual) sculptures out of spare leg splints, cutting into them with a jigsaw. She was exploring the visual languages that this new material could support, a natural mode of enquiry for an art school graduate - apparently playful, but with serious intent. Within the Eames' work, two cultures existed side by side, in a healthy tension: the first directly solving problems and respecting constraints, the second more open-mindedly, even playfully challenging these constraints and exploring further freedoms beyond. The plywood furniture arose from both sides, from the splints and the sculptures.

Within design for disability, where teams still tend to come exclusively from clinical and engineering backgrounds, the dominant culture is one of solving problems. A richer balance between problem solving and more playful exploration could open up valuable new directions. The following chapters explore this and other tensions, each of which is currently biased in one direction; each of which could benefit from a healthier balance.

Subtle Subtitles
by
Calum Pringle
calum @ freecalum.co.uk

to support, not replace, dysarthric speech

designed with and for people with ataxia

participatory design

'Cultural Probes'

designed material used to seed discussion about design qualities

bespoke typography

iPhone running modified *Dragon* speech recognition software,
typography, software and knitwear by Calum

you cannot not
communicate

social event at ISAAC 2008, Montréal

subtle transitions

early experiments with scrolling text proved too distracting

the physical design
is as important
as the interface...

Digital Interaction Design is run across DJCAD college of art
and the School of Computing at the University of Dundee

when idle, screen visually recedes into knitted scarf

... and most of all,
conceiving the two together...

HCI

interaction design

... this is
interaction design

product design

graphic design

... this is what good
interaction designers do

by Calum Pringle
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